STEEL
The Weekly Magazine of Metalworking

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THIS WEEK IN METALWORKING

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Next Week . . . **Obsolete Equipment—Emergency Scrap Reservoir . . . Adequate Instrumentation Minimizes Welding Variable . . . Forgings Descaled 90 Per Cent Cheaper . . . Refined Honing Method Levels "Hills and Valleys"**

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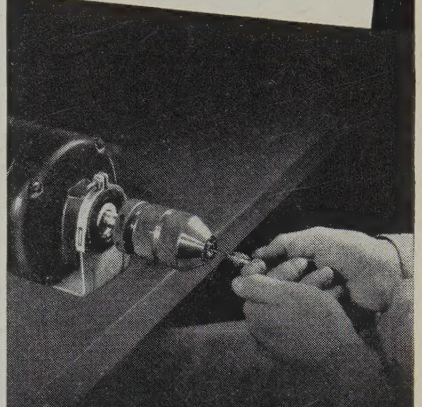
Lapping Carbide 20% Faster!



Carbide spray nozzle orifices are finished to tolerances of .0005" at Spraying Systems Company, Bellwood, Illinois. New Elgin DYMO-C diamond abrasive used in place of diamond powder-oil mixture produces more pieces per hour and conserves diamond, too!

ELGIN DYMO-C* diamond abrasives

*C FOR CARBIDE

Here is a complete new diamond abrasive specially prepared to speed carbide finishing operations. It cuts faster, won't work back on the lap, won't settle and comes ready to use without time-consuming mixing. Write for complete information—ask for a free demonstration.

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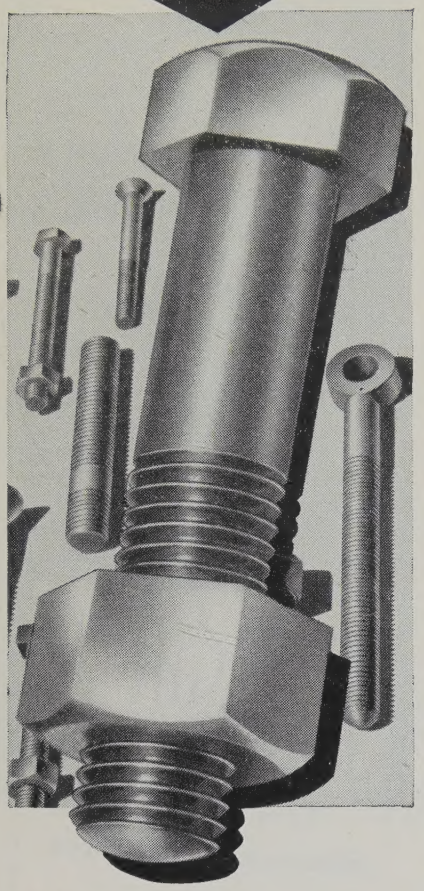
STUDS



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T.M. REG.

Behind the Scenes...

Self-Conference

This specially posed picture of a man holding a meeting with himself demonstrates the plight of Edward Marder, vice president of Ekco Products Co. He represents the housewares industry on six National Production Authority Industry Advisory Committees. He's a member of committees representing producers of stainless steel cooking utensils, tinware, cutlery, kitchen tools, stainless steel flatware and flashlights. What's more, he is a member of the OPS Stainless Steel Cooking Utensil Advisory Committee.

We note that he's smiling in some of the poses above. We don't know how he does it.

Golden Scrap

Iron and steel scrap is getting to be as valuable as gold, and far less plentiful. How the situation in scrap got that way—and what can be done about it—will be described next week, July 23, in a study STEEL is working up as its contribution to the scrap drive.

Many companies are doing their part to speed the flow of the material, among them Luria Brothers & Co. Inc. Luria has prepared a 22 x 28 inch full color poster to remind generators and users of scrap that it is needed. Copies of the poster are available without charge. Write us or Luria—Lincoln Liberty Bldg., Philadelphia 7, Pa.

Now We Know

Great Britain's Health Act defines "infectious disease" this way:

"The expression 'infectious disease' means primarily any disease included in regulations under Subsection 1 of Section 29, whether absolutely or by definition of a particular stage of such disease, but in any Section of Part IV of this Act from the application from which a disease or a stage of a disease is excluded under Subsection 2 of said Section 29, the expression does not include such disease or such disease in such stage, as the case may be."

The Life

If we had it all to do over again, we'd aim at a career on Great Lakes freighters. No work in the winter; when you do work, a life in the invigorating lake atmosphere that thousands of people pay good money each year to be near during vacations.

And now comes the clincher. Pittsburgh Steamship Co. is installing powerful television receiving sets on each of the ore carriers in its fleet for the benefit of the crew.

Puzzle Corner

You have an infinite number of answers in July 2 problem. Al, Bill and Charley can have monies in the proportion of 5-11-13, with the watch 17. The watch costs any multiple of 17 cents. Thus, Al can have $5, Bill $11 and Charley $13. The watch would then cost $17. First in with replies to point that out were James C. Bramham of Meadows Mfg. Co., C. E. Norton of Highland Park, Ill., L. W. Davis of the Fort Worth District of the Corps of Engineers and Ralph Pappenheimer of Specialty Device Co.

Joe rowing downstream drops his hat into the water. He continues rowing downstream for 15 minutes and then decides to return for his chapeau. He recovers the hat one mile downstream from the point he originally dropped it. Neglecting the time required for turning the boat around, figure how fast the stream is flowing.

Shrdlu

(Metalworking Outlook—Page 33)

SAVE 5 WAYS on Pipe Threads

- FEWER MACHINES
- LOWER TOOL COST
- LOWER TOOL INVENTORY
- LESS SET-UP TIME
- HIGHER PRODUCTION

In tightening markets, Landis Pipe hreading Machines offer wide-open pportunities to cut production costs f pipe threads.

Three sizes of Pipe Machines will andle all diameters of pipe from 1/4" o 18". Each die head is constructed o handle a wide range of pipe sizes —for example the 6" machine will hread all diameters from 1" to 6". Universal size adjustment allows quick et-up. Thus, a few machines will andle the complete range.

Die heads employ Landis Tangen- ial Pipe Chasers. Interchangeability f the chasers further increases the ersatility of these machines. The ame chasers may be used for all diameters of threads within the range of a given die head providing that the pitch, form, and taper remain the same, thus reducing tool inventory. Chasers need be replaced only one at a time as needed. Chasers last longer since 80% of their length may be reground as the cutting edge dulls. Line contact with the work reduces friction and chaser wear, allows use of higher cutting speeds, and reduces chaser breakage.

A separate type of machine, the Receding Chaser Pipe Machine, is especially designed to handle A.P.I. Tapered Pipe Threads. Chasers recede into the head at a rate equal to the taper of the thread, ensuring accurate and uniform taper along the full thread length. This mechanism allows the use of smaller chasers, lowering tool cost and dollar tool inventories. Leave-off marks are eliminated by this receding action.

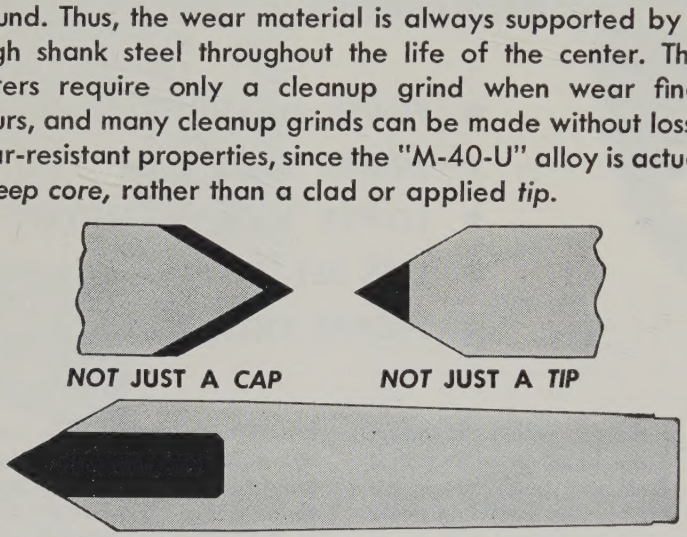
Investigate how Landis Pipe Machines can reduce direct tool cost, increase daily production, and reduce investment in tool inventory and heavy machinery. Write for specifications and further information.

LANDIS Machine COMPANY
WAYNESBORO
PENNA., U.S.A.

Gorham "M-40-U" ALLOY CENTERS
LAST THREE TO TEN TIMES LONGER

Here's a center that outlasts high speed steel and other ferrous and non-ferrous alloy centers from 3 to 10 times before it shows wear—and you can re-dress it countless times!

"M-40-U" is a special alloy developed by Gorham expressly for use as a wear, heat and abrasion-resistant metal. A core of this material is induction brazed in the steel shank of the center, after which the entire center is finish ground. Thus, the wear material is always supported by the tough shank steel throughout the life of the center. These centers require only a cleanup grind when wear finally occurs, and many cleanup grinds can be made without loss of wear-resistant properties, since the "M-40-U" alloy is actually a *deep core*, rather than a clad or applied *tip*.



But a *long, solid core* that you can re-dress many times—and get a good-as-new center every time!

This Gorham center folder gives full description, dimensions and prices. Send for your free copy today.

Gorham "M-40-U" Alloy Centers and Half-Centers are available for immediate delivery. Morse, Jarno or Brown & Sharpe taper shanks, all popular sizes in stock, "specials" to your specification. Put an "M-40-U" Alloy Center on every lathe, automatic and grinder in your shop—watch them pay for themselves in down-time saved, *PLUS* the precision production you get with centers that stay true longer.

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LETTERS
TO THE EDITORS

A Question of Dates

So we can arrange our 1952 convention time with a minimum of conflict with other societies, please send us a list of meetings scheduled for April, May, June and July, 1952.

American Society for Quality Control
c/o R. E. Wagenhals
Timken Roller Bearing Co.
Canton, O.

• *We are sending the list as far as we have it. Many associations have not yet established the dates of their 1952 conventions.*

Materials Handling in Miniature

Under the headline, "No Jigsaw Puzzles," (STEEL, June 25, p. 109) you mention a kit which helps to work out a materials handling problem in miniature form. Can you advise us whom to contact for additional information concerning these kits?

R. A. Goldschmidt, manager of sales
Electrical & Wire Rope Division
Tennessee Coal, Iron & Railroad Co.
Birmingham, Ala.

What company makes the plastic surface planning board and accessories as noted under STEEL's "No Jigsaw Puzzles?"

W. H. Emory Jr.
Klug & Smith Co.
Milwaukee

• *Name of company making these kits is Triometric Inc., 711 Penn Ave., Pittsburgh. The planning boards come in three sizes: $10; $17.50; and $27.50.*

Scrap Hunt Continues

We are completely re-working our foundry dump to remove its metal content. Approximately eight acres are involved. Do you have any record of firms engaged in salvage operations of this kind?

R. C. Sundquist, treasurer
Lakey Foundry & Machine Co.
Muskegon, Mich.

• *One such company is Heckett Engineering Corp., Butler, Pa. The firm has been engaged in salvaging metal from steelworks dumps for more than a decade.*

Asking About Axles

Please explain the meaning of STEEL's market quotation on axles. Are they destined for railroad passenger or freight train cars, or for motor cars? Are they forged and rough-turned, or finished machined?

Dr. H. Neibuhr
Essen-Bredeney
British Zone, Germany

• *Axles quoted are those made for passenger or freight cars operated by American railroads. They are forged at the mill and finished machined at both ends ready for the bearings before shipment.*

Interest in Vermiculite

Who makes vermiculite, the mineral described in STEEL, June 25, p. 109?

W. O. Kugler
Pressed Steel Tank Co.
Milwaukee

• *Zonolite Co., 135 S. LaSalle St., Chicago.*

Phonies

Of the 1,593,000 tons of steel allocated by National Production Authority to the oil and gas industry in the third quarter, 351,000 tons is earmarked for domestic oil and gas country use. This tonnage, coupled with secondhand, foreign and conversion pipe and a reasonable reduction in inventory will permit drilling in the third quarter at the annual rate of 44,300 wells, which is close to the 1950 total.

Seeking a basis for distributing the 351,000 tons fairly, Petroleum Administration for Defense requested oil and gas operators to file applications for tubular goods they would require in the third quarter. A. P. Frame, assistant deputy administrator for PAD, revealed some significant aspects of the response to these requests in a recent address before the Kentucky Oil and Gas Association.

According to Mr. Frame, about 4000 companies filed applications for 1,200,000 tons of tubular goods for third quarter. A single operator asked for 100,000 tons—almost a third of the 351,000 tons available. He said he couldn't explain where he would use the steel until he was sure he could get it. Of the 4000 applicants, 600 had no previous drilling history. When applicants were requested by PAD to furnish date and plat of the lease upon which they proposed to drill, nearly 500 failed to reply.

Mr. Frame explained that a high percentage of established operators cooperated with PAD wholeheartedly. The trouble came from a few chiselers within the industry and to a much greater extent from a few hundred "outsiders," most of whom undoubtedly were trying to get steel to sell in the black market. Probably every agency charged with distributing tight materials has had similar experiences.

Much effort has been expended in trying to track down gray and black market operations. Sen. Blair Moody's hearings, now in progress in Detroit, have this as their objective. It is quite probable that excellent leads are on file in Washington. For instance, what about the company, unheard of in the oil industry, which applies for 600 tons of casing for third quarter? A check-up on such phonies might be illuminating.

E. C. Shaner

EDITOR-IN-CHIEF

WORKERS' OBLIGATION: Some recent work stoppages have occurred because employees resented the efforts of employers to get the same production with a smaller labor force. This prompted Chrysler President L. L. Colbert to point out to his employees the obligations that go with pay raises.

Reminding them that their contract states that "to produce more with the same amount of human effort is a sound economic and social

objective," Mr. Colbert went on to say: "Your pay increase of 4 cents an hour—and subsequent increases as provided for in our agreement with UAW-CIO—is based on the expectation that Chrysler can produce more with the same amount of human effort. Otherwise the improvement factor becomes an unreal theory. If increased production is not forthcoming, any improvement factor increases would contribute to inflation and make your dollar buy less. No one would benefit."

If they are smart, union members will heed this sound advice. —p. 55

* * *

U. S. AID BOOMERANGS: In our Nation's attempt to be a sort of Santa Claus to much of the world, situations arise which place some of our small metalworking industries definitely behind the eight ball. American bicycle manufacturers feel that they are in this predicament and they are appealing to the Tariff Commission for relief.

Their grievance is stated simply. The ten manufacturers who assemble the products and parts of about 250 companies are subject to restrictions caused by material shortages. They have to omit from their cycles some of the trim which has definite sales appeal. But British and German bicycles, undoubtedly produced with American aid, are coming in not only in increasing quantities at low prices, but with glittering trim and attractive accessories which are denied to domestic manufacturers by the same government which grants advantages to the foreign competitors. —p. 52

* * *

WE'RE FOR IT, BUT . . . : Last week witnessed an odd alignment of sponsors of more government controls on prices and wages. Charles E. Wilson spoke vigorously for such controls, presumably to retain such powers as he needs to keep defense production rolling according to schedule. Eric Johnston went all out on the same line. So did most of the leading labor union chieftains.

As to the latter, there is a discrepancy which should be explained. The high command of CIO and AFL is going to great lengths to stir up support for more drastic controls. At the same time that the higher-ups were engaged in this effort, numerous wild-cat strikes were called by their rank and file. How did the strikers explain their walkouts? They said: "We are not striking against our employers. We are striking against federal controls."

How do you figure this contradiction? The dues-paying unionists are striking against the controls their leaders are advocating. —p. 55

* * *

PACKAGING IMPORTANT: Global war has forced military men and manufacturers to revolutionize their ideas about the packaging of hundreds of items used in warfare. In 1942 only 45 per cent of materiel arriving overseas was in usable condition, by 1945 the percentage had climbed to 75 and the present objective of the Defense Department is to raise it to 95 as quickly as possible.

This is going to involve a lot of research by military and civilian experts and also a greater appreciation on the part of defense contractors of the importance of proper packaging. Particularly, it means that a contractor who glosses over the packing and packaging specifications in his contract as being a minor detail is in danger of losing his shirt.

Safest way is to be sure you understand the specifications and figure your costs accurately. Another way is to farm out the packing and packaging part of the contract to specialists. —p. 70

* * *

RESISTANCE STIFFENS: Vote in the House on the Wolcott amendment to the Defense Production Act shows that congressmen are beginning to understand the extent to which the administration's policies are inflationary. The amendment, which was defeated by a 169 to 149 vote, declared it was the intent of Congress that no direct controls over prices, wages and credit could be exercised until indirect controls were utilized to fight inflation.

The Wolcott argument is that the DiSalle and Johnston efforts are futile as long as the administration persists in following a fiscal policy that is inflationary. The close vote on the amendment, coupled with refusal to give Mr. Truman additional powers, indicates an increasing doubt in Congress as to the soundness of the present domestic policies of the Truman administration and gives promise of a further advance toward realism. —p. 48

Good Business, Peace or War?

The experience of one bellwether industry, tool and die making, indicates that high volume can hold. Its 1951 sales will be up 25 per cent over 1950

AT LEAST one economic indicator shows high volume ahead, peace or war.

Based on first half signs, 1951 business for tool and die makers will run at least 25 per cent in advance of 1950 when estimated shipments hit $335 million.

In a STEEL-conducted survey of a cross-section of the 2500 contract shops in the industry, virtually no cancellations of defense or civilian jobs are reported due to the possibility of peace in Korea.

Bellwether—The industry serves as a barometer of the economic weather because its services are needed by metalworking well ahead of actual production of automobiles, refrigerators, aircraft and many other products.

Often tool and die contracts are placed as much as eight months in advance for new auto models; in simpler jobs considerably less time is needed.

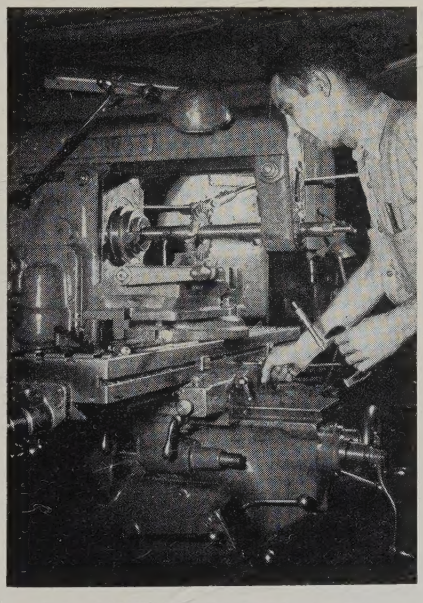
The important tool and die industry is composed of companies that make all kinds of dies (stampings, forging etc.), jigs, fixtures, molds for plastics, special gages, special cutting tools, special tooling and specially designed machines. Some companies also handle orders for short-run production jobs.

George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association, points out that the industry has the order backlog to produce even more than it now is, but it hasn't the manpower to do the job. Its 35,000 to 40,000 employees (not counting those in tooling departments of companies primarily engaged in other work) are now laboring more than 50 hours a week because enough personnel can't be found and trained to man completely first shifts, let alone second, in most plants. Even in World War II, full second shifts were an unusual thing.

A few companies today have managed multiple-shift operations, but most shops have had to resort to expensive overtime to get out the work on schedule.

A Long Time—It takes 8000 hours to train a tool and die maker. Because that time isn't now available, because of the draft and because of the wage freeze, tool and die shops are having a tough time keeping their apprentice training programs moving along.

Training learners is especially difficult because present wage regulations don't permit pay to advance as fast as skills improve. Few tool and die shops have cost-of-living or annual improvement clauses in their labor contracts, so larger industries that do can in effect offer higher wages and thus hire skilled help away from the smaller jobbing facilities.



BAROMETER READING: HIGH

. . . order backlogs are triple 1950's

Right now the industry is campaigning for permission to meet the wage rates being offered by other companies.

Good Record—It has hopes of success. Although small—the average company employs only 15 or 20 workers—it has already done well in Washington. CMP allocations thus far to individual companies have been almost unanimously termed as "fair and reasonable."

So, the experience of a bellwether industry indicates there will be little or no letup in the economic pace, whether we have war or peace. About a month ago, 50 per cent of its volume was for defense. The proportion for rearmament business has jumped to an estimated 70 per cent today. Its order backlogs are now three times what they were in early 1950. New monthly orders are now coming in at approximately double the rate of early 1950.

CMP Regulations 5 and 7

They outline rules and procedure for getting supplies for repairs, additions, operations

NEED steel, copper, aluminum or other scarce materials for repairs, minor capital additions or as operating supplies? CMP Regulations 5 and 7 outline the rules and procedures under which you can obtain them.

CMP Regulation 5, which replaces NPA Regulation 4, provides for the acquisition of maintenance, repair and operating supplies under the Controlled Materials Plan.

CMP Regulation 7 does the same for parts and materials needed by repair shops. NPA Regulation 4 is superseded and revoked.

Self-Serve—Both the new regulations provide self-allotment procedures to obtain materials for MRO and repair shop needs. No application to NPA is required.

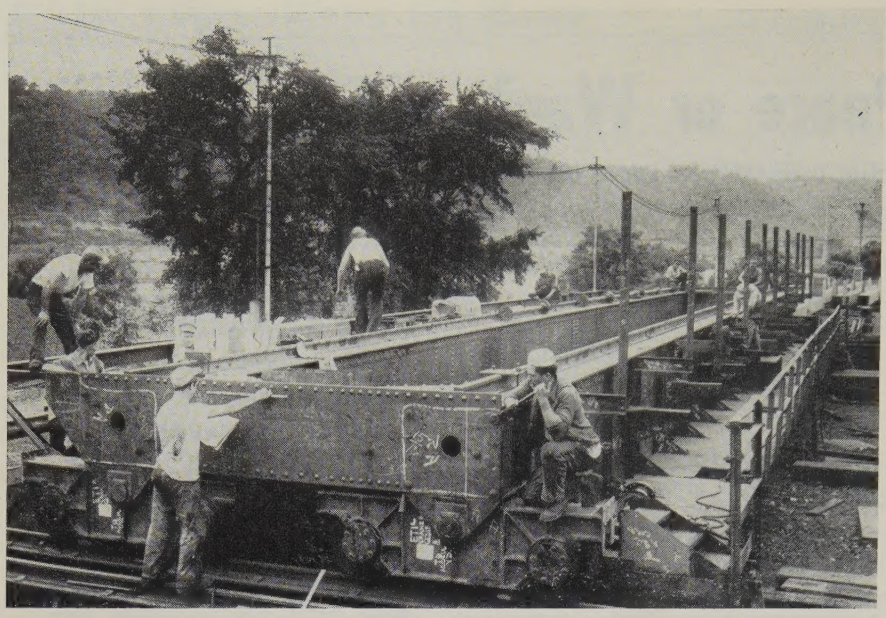
Under CMP Regulation 5, any business enterprise or institution may obtain normal amounts of steel, copper, aluminum and other materials to keep its plants and property in repair and operation and to make minor capital additions.

A major difference between this regulation and the old NPA Regulation 4 is that now manufacturers of A and B products to be used for maintenance, repair and operation will not extend the MRO symbols or the rating DO-MRO to obtain the desired materials, but will get them under procedures established in CMP Regulation 1.

Compute Own Quota—An organization planning to apply MRO symbols to orders for maintenance, repair and operating supplies must first compute its quarterly quota of such materials. The standard base period for this calculation is the calendar year 1950, the standard quarterly quota is 30 per cent of MRO materials purchased during 1950, figured in terms of expenditures.

If you operated on a fiscal year before Mar. 31, 1951, you may take as base period the last fiscal year.

If your business is seasonal, you may figure on a seasonal basis. The seasonal quota will be 120 per cent



DRY RUN: First crane for U. S. Steel's Fairless works takes shape—but not at Morrisville. This is the Ambridge, Pa., plant of American Bridge Co., and it's only a test assembly. After workmen fit together the heavy steel section, the crane will be dismantled for shipment to the mill site. American Bridge is fabricating 48 large cranes for the new plant. Wheels in foreground run on an overhead track extending the length of a mill building

of expenditures during the corresponding 1950 quarter.

If you were not in operation in 1950, get the text of the regulation. It has a formula by which you can figure your quota.

What's Minor?—A repair shop or organization specializing in maintenance and repair work may install minor capital additions for customers to the same extent that the customer would be permitted to make such additions. Cost of materials should be charged to the MRO quota of the customer.

A minor capital addition is defined as an improvement which costs, excluding labor, not more than $750.

CMP Regulation 7 defines the amount of controlled materials that can be obtained by a repairman. This may be either the amount the customer is entitled to under his MRO allotment or the amount the repairman actually needs in doing work for customers who are not entitled to establish MRO quotas under CMP Regulation 5. In the latter case, he uses the allotment symbol RE, assigned to repair shops by Regulation 7. He is limited in any calendar quarter to the following amounts of controlled materials: Steel, 20 tons, including not more than 3 tons of alloy steel and 1 ton of stainless; copper and copper-base alloy brass mill products, copper and copper-base alloy foundry products and powder, 500 pounds; aluminum, 500 pounds.

Actual Need Is Basis—A repairman who requires copper wire mill products for functional uses in his repair and maintenance work may use the allotment symbol RE on orders for these products to the extent of his actual need for the materials on jobs for customers not entitled to an MRO quota, but not in any one quarter for more than $150 worth or 20 per cent of what he used in his repair and maintenance work during 1950, whichever is greater.

To obtain materials other than steel, copper or aluminum, a repairman may use the rating DO-RE on orders for amounts he actually needs in his work for customers who have not the right to use the DO-MRO ratings.

To obtain other than controlled materials for jobs for customers who do have the right to the DO-MRO rating, the repairman must use that rating and not the DO-RE.

Small Users Get CMP Coverage

All small users of steel, copper and aluminum can obtain benefits of CMP allotments under a forthcoming amendment to Direction 1 of CMP Regulation 1. At present the direction applies only to those manufacturers of products not identified with an asterisk in the original Class B product list.

No application or report to NPA will be required by the small user. He can apply the DO-SU rating himself and send his order directly to the mill or warehouse supplier. The symbol can also be applied to orders for production materials other than controlled materials that are needed to complete schedules.

Warehouses and mills will accept orders from a small user only when they know that the quantity ordered is in line with his requirements. NPA won't concern itself with these orders—unless suppliers report situations getting out of hand.

Producers affected are those whose quarterly requirements for manufacture of a Class B product, and of all other items in the same product class, do not exceed the following amounts of any of the controlled materials listed: Carbon steel (including wrought iron), 5 tons; alloy steel (except stainless), ½ ton; stainless steel, none; copper and copper-base alloy brass mill products, copper wire mill products, copper and copper-base alloy foundry products and powder, 500 pounds; aluminum, 500 pounds.

Regulation Enforcement

It's going to be vigorous—and stiff on violators of rules laid down by NPA

VIGOROUS ENFORCEMENT of compliances with NPA regulations covering control of critical materials (steel, copper and aluminum in particular) is in prospect. The word is that where there are wilful violations actions will be taken to impose fines as well as jail sentences. Such a policy was outlined in New York by Robert H. Winn, assistant general counsel of NPA, after he had completed a 13-state tour of Commerce Department regional and district offices.

Most violations reported to date concern excessive inventories and misuse of defense-rated orders. Mr. Winn says the agency's policy is primarily to assist and not to harass industry in complying with NPA regulations. Ten cases are far enough along for prosecution and others may be filed shortly.

Crack-Down—Actually, just about all businessmen are trying to conform with the sprit and intent of the regulations, says Mr. Winn, but there are those who don't and they will be prosecuted. Despite problems posed by extra stocks and their misuses in some cases, he thinks reports of excessive inventories in most instances are unfounded. More than 200 inventory checks, says he, reveal few cases of extra stocks. "The fact is," he points out, "there just isn't an important accumulation of stocks in the distribution field." And that is to say nothing of a tight situation generally at consuming plants.

Compliance with NPA regulations

vill be handled through Commerce Department regional offices. NPA has ome 300 investigators (some with ccounting experience). Under CMP hey will audit company books. Another 300 men (all experienced accountants) are lined up and will take over compliance duties when funds are available.

Pig in a Poke?—Taking a crack at mported steel, Mr. Winn said: "The rouble with imported steel is that nuch of it doesn't come up to specification. Consumers are hesitating nore and more before buying a 'pig n a poke'."

Mr. Winn, incidentally, anticipates a shortage of steel, aluminum and copper throughout the first half of 1952; he believes supplies will become a lot tighter yet before they improve. His opinion is not shared by some steel producers who look for a reasonable balance of supply and demand by yearend.

Tax Benefits Decline

The U. S. in the week ended July 6 was not as open handed as usual with tax benefits.

Defense Production Administration authorized only $125 million in new facilities as eligible for fast five-year writeoffs. That was less than half the $258 million in new facilities receiving such benefits in the previous week and was the second smallest amount since the government began making public its weekly tally of those benefits early last spring.

Only one company, Union Pacific Railroad, received permission to amortize a facility estimated to cost over $10 million. It was authorized to write off 80 per cent of the $17 million it expects to spend on railroad freight facilities. Twenty-five other firms received permission in the week to amortize new projects estimated to cost over $1 million but less than $10 million. The most common type of expansion included in that group was for the production of butane and gasoline.

The latest batch of certificates brought to nearly $7722 million the value of new facilities deemed vital enough to have received fast amortization privileges since the Defense Production Act went into effect last fall.

The number of projects involved with the July 6 week's 154 new facilities added brought to 2464 the number eligible for the fast writeofffs.

Life Still in New England Plan

There's still life—although a little faint—in the proposed New England steel mill project. Project sponsor, New England Steel Development Corp., has won its second four-month extension on the original certificate of necessity that would allow part of the facilities to be written off for tax purposes in five years.

Although fruition of the plans looks doubtful unless an existing steel company can be interested in the construction and operation of the plant, renewed interest has developed following the report by the President's Council of Economic Advisers indicating that a mill is needed in New England and that a market exists for its production.

Republic Buys Cleveland Site

Republic Steel Corp. paid $400,000 for a 28-acre tract owned by the state adjoining its Cleveland plant. The company will build a byproduct coke plant and a 1400-ton blast furnace on the property.

CMP Hitch May Snarl Steel Distribution

Some consumers, armed with CMP allotments, are booking orders with neighboring mills they don't normally do business with in a bid to save freight costs

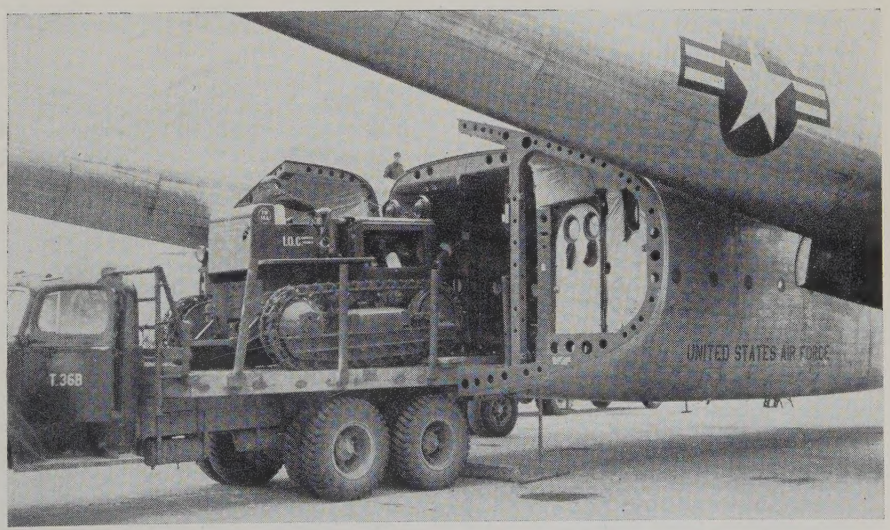
FIRST major hitch in administration of CMP was unresolved last week.

The trouble is this: Steel mills are receiving orders backed by CMP allocations from firms with whom they have never or rarely dealt. There's no priority among CMP orders, so thus far the steel producers have had to take the CMP contracts on a first-come-first-serve basis. That means that some old customers with allocations may be out of luck in getting steel from regular suppliers, for beginning in September producers have been directed to sell to nonessential buyers only after preferred order bookings pass specified percentages.

The Reason Why—The shakeup in normal steel supply channels threatens because of freight rates. Companies with CMP allotments are turning to steel mills closer to home to cut down on transport costs. When steel distribution was free or under the DO plan, many consumers had to go hundreds of miles to get what they wanted, and they had to pay the freight. Some companies see a chance to bypass that situation because of the way CMP is now constituted.

At least one major steel producer has pointed out the problem to National Production Authority in Washington, with a suggestion of how the status quo in steel distribution could be maintained. It was turned down.

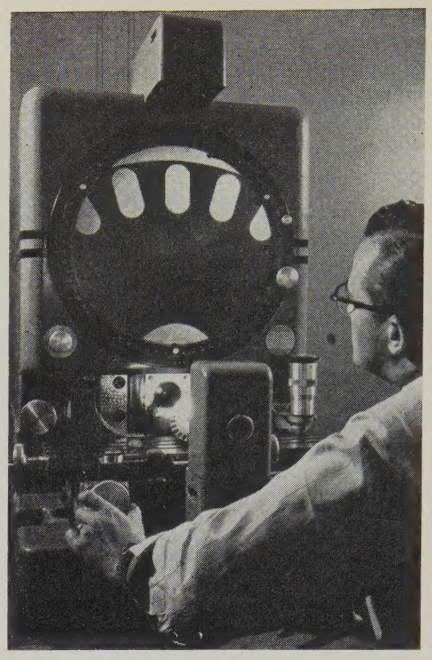
Complication — The situation is complicated by another NPA directive. Last week the agency told steel mills that starting in September when the producers are to begin giving the green light to holders of CMP allocations and priorities, they must red light those preferred orders if they exceed specified percentages of their output of those products. The rest of their production is to be reserved as free steel for makers of autos, refrigerators and other consumer durable goods at these quotas:



CALL OF THE WILD: Heavy construction equipment for the Labrador-Quebec mines of Iron Ore Co. of Canada is flown to the site over desolate bush country that would require weeks to travel on the ground. Here an International tractor eases aboard a C-119 Flying Boxcar on loan from the U. S. Air Force. Fifteen units have been flown to the Knob Lake, Labrador, camp so far

The table below gives the set-aside percentages of the output of each product for priority orders beginning in September. Thus, a maker of hot-rolled sheets must refuse preferred orders for more than 70 per cent of his monthly production.

	%
Ingots	95
Blooms, slabs, billets (including projectile and shell quality)	95
Sheet bars	95
Tube rounds	100
Skelp	95
Wire rods	95
Structural shapes	90
Piling	90
Plates	By directive
Rails, standard (over 60 pounds)	100
Rails, all other	90
Joint bars	100
Tie plates	100
Track spikes	100
Wheels and axles, railway and transit only	100
Bars, hot rolled, other (including projectile and shell quality)	78
Bars, reinforcing	70
Pipe	95
Oil country goods	100
Line pipe	100
Wire, low carbon	90
Wire, high carbon	85
Wire nails and staples	90
Barbed and twisted wire	90
Wire fence, woven and welded	90
Bale ties	95
Tin mill products, any combination	95
Sheets, hot rolled	70
Sheets, cold rolled	54
Sheets, galvanized	80
Sheets, all other coated	43
Sheets, enameling	10
Electrical sheets and strip, low and medium grade	95
Strip, hot rolled	70
Strip, cold rolled	60
Fence posts	90
Wire rope and strand	85
Welded wire mesh	75
Netting	95
Pig iron	20



SIGNIFICANT SHADOWS: At Ford Motor Co.'s Ypsilanti, Mich., quality control laboratory technicians can check dimensions of automobile parts to less than a hairbreadth—0.0001 inch to be exact. Here an operator checks a starting motor part by examining its greatly magnified shadow on a Kodak contour projector

WHERE ALLOCATED THIRD QUARTER MATERIALS WILL GO

Claimant Agencies and Miscellaneous	COPPER (pounds)	STEEL (tons)	ALUMINUM (pounds)
CAA & CAB (Airports)	271,000	2,782	23,000
DEPA (Construction)	77,000,000	300,000	38,000,000
DSFA (Coke Ovens)	624,000	22,635	———
FSA (Construction)	5,200,000	175,840	550,000
Maritime Administration	5,500,000	110,000	300,000
PAD	10,100,000	1,593,000	600,000
Federal Airways	200,000	285	13,000
Public Roads	750,000	300,000	———
Other Construction	31,000,000	1,271,641	8,000,000
NPA Industry Divisions			
Agricultural Machinery	8,619,000	673,723	6,774,000
Aircraft (Civilian)	500,000	13,000	4,228,000
Building Materials	69,156,000	1,374,416	79,993,000
Chemicals	172,000	———	3,322,000
Communications Equipment	53,670,000	67,700	2,618,000
Construction & Mining Machinery	7,721,000	763,500	2,375,000
Consumer Durables	17,270,000	337,851	8,059,000
Containers & Packaging	157,000	1,647,910	4,878,000
Electrical Equipment	131,497,000	566,410	26,488,000
Electronics	24,360,000	52,500	13,200,000
Engines & Turbines	12,720,000	621,350	3,271,000
General Components	169,679,000	1,147,750	13,940,000
General Industrial Equipment	111,131,000	1,715,500	37,455,000
Leather	248,000	5,689	653,000
Lumber	47,000	29,981	254,000
Motion Picture	1,862,000	8,909	2,810,000
Motor Vehicles	122,214,000	1,897,601	64,301,000
Ordnance & Shipbuilding	8,999,000	164,269	1,189,000
Railroad Equipment	37,385,000	882,417	6,300,000
Rubber	4,568,000	34,246	312,000
Scientific & Technical Equipment	50,445,000	94,500	14,700,000
Service Equipment	2,527,000	37,295	3,710,000
Mining	3,037,000	104,818	188,000
Total Allotments	968,629,000	16,017,518	348,500,000
Total Estimated Output	1,114,000,000	20,825,000	598,000,000
"Free" Material	145,371,000	4,807,482	249,500,000

Process Equipment Needs

Demand for control apparatus for defense rises 300 per cent and boosts subcontracting

A 300 PER CENT gain in demand for scientific apparatus and process instruments for basic defense industries is forcing the 15 or 20 companies that specialize in those devices to subcontract more of their work.

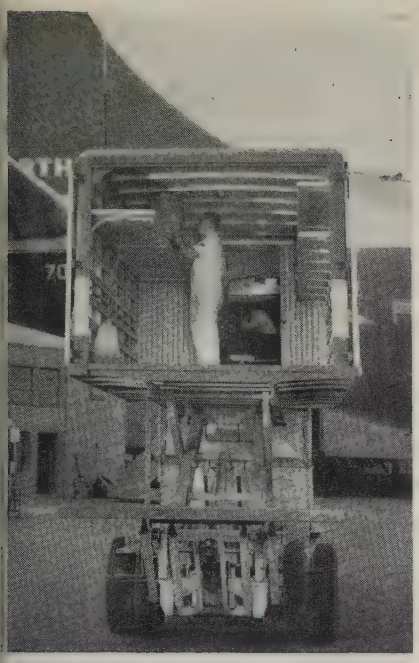
A major producer, Brown Instruments Division, Philadelphia, of Minneapolis-Honeywell Regulator Co., says it has subcontracted for about $100,000 in parts. An equal amount is being subcontracted for tooling at this time.

Yet To Come — Henry F. Dever, president of Brown Instruments, says that subcontracts to supplement manufacturing will amount to 10,000 to 15,000 machine hours a month in production work and a total to the end of the year of 15,000 to 20,000 man-hours for tooling work. Although substantial, that is only a small part of Brown's total production. More defense subcontracts will be coming. "We expect," says Mr. Dever, "that further awards will result from the co-operative action of the Chamber of Commerce of Philadelphia and Armed Forces Regional Council." The Business Development Center, sponsored by the Philadelphia chamber, is screening subcontracting bids it receives for work wanted by Brown.

Mr. Dever believes that the end of the greater demand is not in sight for scientific apparatus and process instruments for basic defense industries—now running 250 to 300 per cent above pre-Korean levels. The increased need for such equipment arises partly because of the skilled manpower shortage. The apparatus, says the Brown Instruments president, "provides the catalyst that speeds output in heavy chemicals, metal producing and processing, petroleum, rubber, plastics, pipe lines, textiles and atomic energy."

Double Help—Scientific apparatus and process instruments make it possible to break down complicated industrial process operations into simpler tasks where unskilled and semi-skilled can do the job. Mr. Dever also attributes some of the unusual increased demand for process instruments to recognition that those devices are one way to expand industrial production without necessarily adding to plant facilities.

Makers of control apparatus do a business that ranges from $60 million to $100 million annually, Mr. Dever says.



MODERN CHUCK WAGON: Northwest Airlines loads commissary supplies and cargo aboard Stratocruisers and DC-4s by this hydraulically operated check wagon. The unit rises to a height of 10 feet to reach the high galley doors on the four-engine planes

Relief for Tool Builders

More equitable pricing treatment comes to the industry that has been hard hit since 1945

TO BREAK the bottleneck in the machine tool industry, Mobilization Director Charles E. Wilson ordered the Office of Price Stabilization to modify price controls for the industry to the extent necessary for essential expansion.

OPS issued GOR (General Overriding Regulation) 15 permitting machine tool makers to make liberal individual adjustments in ceiling prices. GOR 15 goes into effect July 16 whether or not machine tool manufacturers are pricing under CPR 30. Otherwise the effective date of CPR 30, originally July 2, is postponed pending congressional action on price control legislation.

Cost Plus—GOR 15 goes beyond Supplementary Regulation 2 which was to give the industry price relief by allowing it to include increased costs for overtime and shift premium labor. Under GOR 15 a machine tool maker may get an overall adjustment enabling him to realize 80 per cent of his average rate of return from 1938 to 1948. For a particular machine tool or attachment, a manufacturer may get an adjustment giving him his total cost plus a profit of 5½ per cent.

Machine tool makers must file reports with OPS' Industrial Materials & Manufactured Goods Division before selling at increased prices permitted by the regulation. Within 60 days after a year has elapsed they must show actual rates of return compared with previous calculation or in the case of particular adjustments, actual average total unit costs.

A Higher Mark—The defense program is shooting for an annual machine tool production rate of $1 billion by yearend as compared with a rate of $432 million last March and of $675 million now.

Mr. Wilson's directive also called for assistance to the industry in procurement of adequate facilities, materials and components; easier financing, pooling of orders; the encouragement of subcontracting to assist a small manufacturer; and help in overcoming manpower problems.

The Labor Scene

The rate of voluntary quits—more than twice the layoff rate—shows labor riding high

THE LABOR PICTURE carries highlights, shadows and wavy lines.

The highlights are reflected from the iron and steel industry which met the highest monthly payroll in its history in May. It employed more persons than ever before—667,300—and paid out a whopper of a payroll—$249,007,000. That was an increase of more than $49 million from May of last year and more than double the average monthly payroll of ten years ago.

Slowdowns—Strikes and walkouts clutter up the labor scene: Chrysler and Hudson in Detroit last week were having their hands full with almost daily walkouts. At different times as many as 22,000 were idle at Chrysler Division plants, alone. In Cleveland 3000 employees of Addressograph-Multigraph Corp. struck.

A thousand employees at the Lorain, O., shipyard of American Ship Building Co. were idled. At last week's end meetings were going on between company and union officials at Ishpeming, Mich., seeking to end the strike of 300 Cleveland-Cliffs Iron Co. employees.

Pay Hike—Westinghouse agreed to grant unions representing a majority of its employees a 9-cent-an-hour pay hike, effective April 16.

The wavy lines sketched on the labor canvas were made by factory layoffs, hiring and the quit rate: Layoffs of workers in manufacturing industries rose in May for the second straight month largely because of cutbacks in auto output; the layoff rate per 1000 employees rose to 13 in May from 10 in April and 8 in March. Sharpest rise in layoffs was in the transportation equipment industry, including automobiles, where the rate went up from 19 per thousand in April to 36 in May. Despite the rise in layoffs, factory workers continued to be hired in May at about the same rate as in the three preceding months —45 per 1000 employees.

The relatively high rate of voluntary quits—more than twice the layoff rate—shows a well sustained demand for labor. Confirmation comes from the Census Bureau which says unemployment, showing the usual May-June rise, was at a postwar low for this time of year.

Steel Output Smashes June, Quarter, Half Records

STEELMAKING furnaces produced more steel in the second quarter and in the first half of 1951 than ever before in history, says American Iron & Steel Institute. June output was a record for that month: 8,658,000 net tons. Output in 1951's first half was 52,273,000 net tons as against 47.2 million tons in 1950's first half.

The record high output of the second quarter —26,593,000 tons—compares with 25.7 million tons in first quarter and 24.9 million tons in the second quarter of 1950.

In the first half of this year, for the first time in history, steelmaking furnaces were operated through six months at an average of 101.1 per cent of capacity compared with 98.0 per cent in the second half of 1950 and 95.7 per cent in the first half of 1950.

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly	Number
1951	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	production (Net-tons)	of weeks in months
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
February	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Quar.	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
*May	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
†June	7,669,000	102,4	403,000	87.1	586,000	94.3	8,658,000	101.0	2,018,000	4.29
†2nd Quar.	23,597,431	103.9	1,204,122	85.9	1,791,467	95.0	26,593,020	102.3	2,044,045	13.01
†1st 6 mo.	46,437,550	102.8	2,370,885	85.0	3,464,508	92.4	52,272,943	101.1	2,020,601	25.87

Note—The percentages of capacity operated are calculated weekly capacities of 1,746,337 net tons open hearth, 107,806 net tons Bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of January 1, 1951 as follows: Open hearth 91,054,020 net tons; Bessemer 5,621,000 net tons; Electric 7,554,630 net tons; total 104,229,650 net tons.
* Revised. † Preliminary figures, subject to revision.

Hetz To Auction Smith Equipment

When Smith Contracting Corp. completed a 200-mile stretch of the 30-inch natural gas pipeline from Texas to New Jersey, it found it had a surplus of plate fabricating and earth moving machinery that it couldn't use for its normal requirements in the Texas field. Smith called in Hetz Auction Sales Inc., liquidator and auctioneer of Warren, O. So, on August 7, at Manassas, Va., 15 miles southwest of Washington, the reconditioned equipment will be auctioned off. Inspection can be made from July 16 to date of sale.

Westinghouse Wins Steel Order

Westinghouse Electric Corp. will supply about $350,000 worth of electrical equipment for an East Coast steel mill.

The plant will be used to convert iron-bearing materials from small particles, unsuitable for blast furnace reduction, to large porous lumps suited for charging blast furnaces.

Harvester Sublets 90 Per Cent

International Harvester Co. will subcontract between 80 and 90 per cent of the material it requires for present prime government contracts.

Harvester President John L. McCaffrey supports that statement with an analysis of three prime contracts, with a total dollar value of about $355 million, for an armored utility vehicle, an ordnance-designed motor truck and a military fuse. Harvester has already made arrangements with 327 subcontractors to participate in work on the armored utility vehicle. These 327 subcontractors have made arrangements with 1377 subcontractors of their own. Some 816 of the total 1704 subcontractors employ 500 or less. Harvester employs 219 subcontractors on the ordnance truck, and 90 per cent of the dollar value of the truck contract has been sublet. Only 20 per cent of the dollar volume of the fuse contract has been subcontracted. Of the 37 parts in the fuse, outside suppliers are making 30.

Normally, Harvester needs the daily help of more than 25,000 businesses to produce its civilian products.

Forms Small Business Liaison

Prime contractors whose agreements with the Air Force offer opportunities for subcontracting have been asked by the Air Force Office of Small Business to name a plant official to act as small business liaison agent with the Air Materiel Command. Procurement officials believe this policy will help to spread subcontracting dollars among as many small concerns as possible.

Has Steel Cartridge Case Award

Norris-Thermador Corp. will ready 435,000 square feet of its plant buildings at Riverbank, Calif., to make steel cartridge cases under contract with Army Ordnance. Engineering services and installation of special manufacturing facilities will cost an estimated $20 million, says K. T. Norris, president.

Rehabilitation work will begin within sixty days and Mr. Norris expects production to start early in 1952. Under three-shift operation, the plant would use almost 10,000 tons of steel a month. The company made steel cartridge cases in World War II and has continued in limited post-war production.

STEEL's Weekly Summary of Subcontract Opportunities

THE AIR FORCE production program for Pratt & Whitney's J-48 Turbo-Wasp adds subcontract possibilities for small businesses equipped to supply aircraft manufacturers. Two companies who will be major producers illustrate the opportunities that should result with reports on their projected operations.

Chrysler Corp., licensed in January by Pratt & Whitney to make the J-48, has a $91 million Navy contract to build a 1.6-million-square foot plant in Macomb county near Detroit for the job. Two new plants in Chicago, totaling 1 million square feet, are being completed by Hotpoint Inc. and will be used entirely for making the Turbo-Wasp engine. Production at Hotpoint will start in late fall, but no estimate is made by Chrysler for its Detroit operation.

Another jet engine program that should get increased attention as a subcontract possibility is that for the J-47-GE-23. General Electric Co. will build the engines at its Lynn, Mass., and Lockland, O., plants; Packard Motor Car Co. will turn them out at Detroit and Studebaker Corp. at South Bend, Ind.

In other awards reported, Missouri Valley Steel Co., Leavenworth, Kans., will construct 14 passenger cargo ships and 28 tugs, all diesel-powered, under a $7.5 million contract . . . National Steel & Shipbuilding Corp., San Diego, has a $5 million award from the Navy to build vessels of undisclosed type . . . Oliver Corp., Euclid, O., will turn out 2008 tank transmissions and final drive assemblies at a cost of $3.2 million.

More contracts awarded by the government follow in STEEL'S weekly summary:

PRODUCT	CONTRACTOR
Pumps, Fuel (motor driven)	Adel Div., General Metals Corp., Burbank, Calif.
Hydraulic Jacks	Auto Specialties Mfg. Co., St. Joseph, Mich.
	Dayton Aircraft Products Inc., Dayton, O.
Screw Jacks	Duff-Norton Mfg. Co., Pittsburgh
Primers	Western Cartridge Co., East Alton, Ill.
Tractors, Wheel Type	Buda Co., Harvey, Ill.
	Minneapolis-Moline Power Implement Co., Minneapolis
	Wooldridge Mfg. Co., Sunnyvale, Calif.
	J. I. Case Co., Racine, Wis.
Tractors & Trailers	M-R-S Mfg. Co., Flora, Miss.
Tractors, Crawler Type	Caterpillar Tractor Co., Peoria, Ill.
	International Harvester Co., Melrose Park, Ill.
Tractors, With Sawpower Units	Little Giant Tree Feller Corp., Dallas
Trucks, Coal Delivery	Wall Mfg. Co., Winston Salem, N. C.
	Baughman Co., Jerseyville, Ill.
Fire Trucks	General Fire Truck Div., General Detroit Corp., Detroit
Scrapers	R. G. LeTourneau Inc., Peoria, Ill.
	Wooldridge Mfg. Co., Sunnyvale, Calif.
	American Tractor Equipment Co., Oakland, Calif.
Wagons, Crawler Mounted	Athey Products Corp., Chicago
Trailers	Electric Wheel Co., Quincy, Ill.
Snow Plows	Gledhill Rd. Machinery Co., Galion, O.
Compressors	Le Roi Co., Milwaukee
	Johnson Service Co., Milwaukee
Asphalt Plants	Barber-Greene Co., Aurora, Ill.
	Cleaver Brooks Co., Milwaukee
Gradation Control Units	Barber-Greene Co., Aurora, Ill.
Spreaders, Aggregate	W. E. Grance Mfg. Co., Dallas
Distributors	E. D. Tenyre & Co., Oregon, Ill.
Loaders, Excavators	Pettibone-Mulliken Co., Chicago
Loaders	Ottawa Steel Products Co., Ottawa, Kans.
	Frank C. Hough Co., Libertyville, Ill.
	American Tractor Equipment Co., Oakland, Calif.
Winches	Jacques Power & Saw Co., Denison, Tex.
Cranes	Bay City Shovels Inc., Bay City, Mich.
	Link Belt Speeder Corp., Cedar Rapids, Iowa
Fork Trucks	Ross Carrier Co. Inc., Benton Harbor, Mich.
Conveyors	A. B. Farquhar Co., York, Pa.
Cannon Parts	Fallkill Machine Co. Inc., Poughkeepsie, N. Y.
	Machine Products Co., Houston
	Redco Tool Div., Red Lion Cabinet Co., Red Lion, Pa.
	Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.
	Hexagon Tool & Engineering Corp., Dearborn, Mich.
	Premier Textile Machinery Co. Inc., Jersey City, N. J.
Suburban Carryalls	Chevrolet Motor Div., General Motors Corp., Detroit
Adaptors	Bastian-Morley Co., Inc., La Porte, Ind.
Indicators, Dial Type	Federal Products Corp., Providence, R. I.
Generator Sets	International Fermont Machinery Co. Inc., Ramapo, N. Y.
	Consolidated Diesel Electric Corp., Stamford, Conn.
	John R. Hollingsworth, Clifton Heights, Pa.
Motor Generator Sets	Electric Products Co., Clarkstone Rd., Cleveland

CHECKLIST ON CONTROLS

VERNMENT control orders are digested or d each week in this "Checklist on Con- s." For complete copies of NPA orders, e to U. S. Commerce Department, Division Printing Services, attention E. E. Vivian, m 6225, Commerce Bldg., Washington 25. ESA orders, write J. L. Miller, Economic bilization Agency, Room H367, Temporary ldg., Washington 25.

Materials Orders

PPER—NPA Order M-74, effective y 1, 1951, prohibits use of copper and per-base alloys in the manufacture of items of building materials after y 1, 1951. In effect, this order takes er many of the restrictions on the use copper and copper-base alloys in ilders hardware items formerly in- ded in NPA Order M-12. NPA Order 4, NPA's basic construction order, now ludes many of the restrictions on the of copper and copper-base alloys in -the-site use construction items for- rly in NPA Order M-12.

NSTRUCTION — Amendment of ly 1, 1951, of NPA Order M-4 (con- uction) provides for several new pro- ions and adjustments, including limi- ions on the use of copper and alum- um for construction.

PPER—Amendment of July 2, 1951, NPA Order M-12 revises this order it pertains principally to the produc- n of brass and wire mills and found- s. The order also governs the use of pper and copper-base alloy products chemicals, plating and other items t covered by other orders or programs thorized under the Controlled Mate- ls Plan. The controls in M-12 will be fective only during July. This order ll be superseded by revised M-16, hich will control the distribution of pper raw materials.

BRISTLES — Amendment of July 3, 1951, of NPA Order M-18 is designed to relieve hardships of bristle importers and manufacturers of bristle brushes, and to tighten some provisions of the order.

ZINC—Amendment of July 5, 1951, of NPA Order M-9 places slab zinc under complete NPA allocation beginning Aug. 1, 1951.

STEEL SHIPPING DRUMS — NPA Order M-75 limits uses of new and used steel drums and limits inventories of new and used drums to a 45-day supply. Packing of 44 items, including some chemicals, food and miscellaneous products, is prohibited after Sept. 1. Packers are prohibited from using drums for products which they did not pack in drums during year ended July 1, 1951. Packers are permitted to use during any calendar quarter 22½ per cent of the new drums used in calendar year 1950.

MARINE MRO—Amendment to M-70, July 6, provides priority assistance for procuring marine maintenance, repair and operating supplies and minor capital additions. Marine firms which formerly applied DO-91P ratings to their orders may now apply for CMP allotment numbers to obtain controlled materials. DO-91P-rated orders for third quarter delivery automatically will be considered as authorized controlled materials orders.

ALLOY STEEL—Amendment of July 6 to M-1 provides set-asides for alloy steels will be computed on basis of planned monthly production rather than on shipments during previous base period. Action taken to make M-1 conform to CMP.

ALUMINUM—Amendment of July 6 to M-5 makes the order conform to CMP. It makes aluminum forms and shapes, listed in M-5, conform with Schedule 1 of CMP Regulation 1, brings authorized controlled materials orders within provisions of M-5, provides for continuance of provisions for equitable distribution of rated orders among suppliers, assures independent fabricators a supply of pig and ingot from primary producers and limits size of orders which distributors must accept.

NPA Delegation

CONSTRUCTION—Amendment of July 11 to NPA Delegation 14 authorizes eight government agencies to process applications to commence construction and operate under CMP. Affected agencies are: Federal Security Agency, Veterans Administration, Department of Agriculture, Housing & Home Finance Agency, Department of Interior, Petroleum Administration for Defense, Department of Commerce and Defense Transport Administration. FSA's authority is broadened to permit construction of school gymnasiums under certain conditions.

NPA Regulation

MRO—Regulation 4 is revoked July 6, being superseded by CMP Regulations 5 and 7.

CMP Regulations

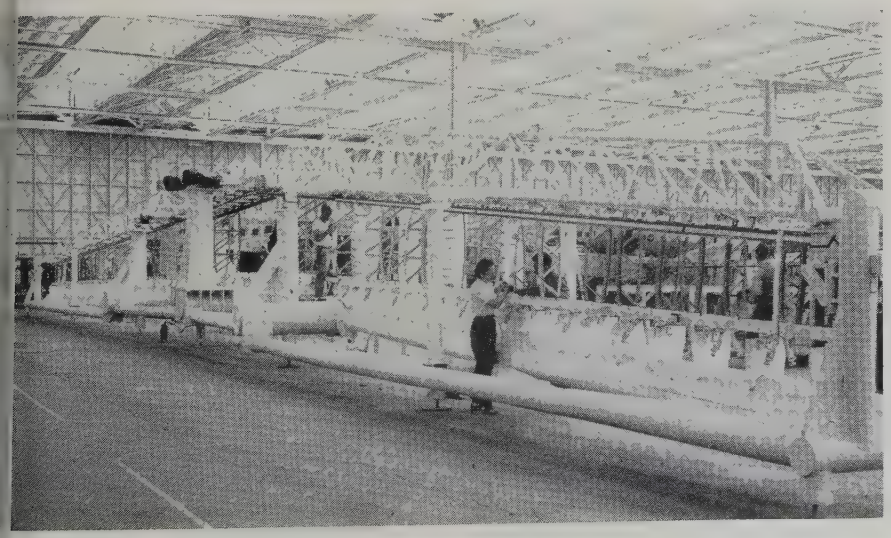
MRO—CMP Regulation 5, July 6, provides for acquisition of maintenance, repair and operating supplies under the Controlled Materials Plan. It replaces NPA Regulation 4, which is revoked (See page 41).

REPAIRMEN — CMP Regulation 7, July 6, provides for acquisition of supplies by repairmen under Controlled Materials Plan (See page 41).

DO RATINGS—Direction 2 to CMP Regulation 3, July 3, provides DO ratings previously assigned to be given equal status with authorized controlled materials orders during the third quarter.

Price Regulation

STOCKPILE MATERIALS — Amendment 1 of General Overriding Regulation 2 of the Office of Price Stabilization relaxes ceiling price restrictions on strategic and critical materials purchased by the General Services Administration for stockpiling. The amendment was effective July 3, 1951.



NE-SECTION WING: A 115-foot steel fixture weighing 50,000 pounds is elping Consolidated Vultee Aircraft Corp., San Diego, Calif., save weight in s Convair-Liner 340. Wings will be assembled in one section instead of three sed in the 240 wing. The fixture is the largest ever built by Convair for producing complete wings

Blaw-Knox Says Charge Unfair

Reaction of Blaw-Knox Co. to the government's civil anti-trust suit filed against it was that the government unfairly implies that the company is engaged in a conspiracy affecting national defense.

William P. Witherow, Blaw-Knox president pointed out that "the action deals with arrangements to export roll-making know-how to an allied country. In fact," he continued, "it is pretty much in keeping with the spirit of the government's own Point Four program." Mr. Witherow stressed that the matter in no way related to the national defense program.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The close vote on the Wolcott amendment to the Defense Production Act proves that a growing number of congressmen are trying to stem the inflationary tide

REJECTION of the Wolcott amendment to the Defense Production Act—intended to stop the inflationary policy of the Truman Administration was a defeat but not a rout of industry forces. The 149-pro and 169-con vote proves that a growing number of House members is aware of the inflationary course of the administration—and oppose it.

Design — The amendment would have declared it the intent of Congress that no direct controls over prices, wages and credit could be exercised unless and until indirect controls were utilized to fight inflation. Debate on the measure focused attention on the policy pattern by which value of currency is tied to the federal debt: The higher the debt, the cheaper the money and the higher the prices. The effect is a blush of prosperity and its continuance requires more inflationary shots every now and then.

Spelling — Rep. Jesse P. Wolcott (Rep., Mich.), who is father of the amendment, spelled out what the administration's fiscal policy means: 1. Reduction from 40 to 25 per cent in the gold reserves behind federal reserve bank notes. 2. Backing up of government notes with government bonds (debts) instead of with commercial paper. 3. Power of the administration to regulate inflation by the discount rate instead of using its power to fight and hold inflation in check.

Arithmetic—That all adds up to this: As long as the administration is free to follow such a pattern, the best efforts of an economic stabilizer amount to no more than a hill of beans as a bulwark against inflation.

Drama — Debate on the Wolcott amendment dramatized the impression one gets that the new powers requested by the administration (STEEL, May 14, p. 51) are intended not to fight inflation but to give the administration more control over the economy.

Latitude—Current indications are that Congress will refuse to give the President three powers that are particularly objectionable to industry. One would set up a federal licensing system for business concerns. Another would permit establishment of national production councils where labor and public representatives could overrule management representatives. The third would give the administration wide latitude in putting the government in industry in competition with private business.

Code for Inventors . . .

A good bet is that the National Inventors Council will win its fight for a code under which inventors contributing to the defense program will be assured of adequate compensation for their ideas. Here's why: (1) The President appointed an interdepartmental committee to study the matter; (2) Secretary Marshall created a top-ranking committee of the three services to see what can be done to remove inequities in dealing with inventors and inventions; (3) a bill to create an Inventors Award Board is being drafted by a leading senator. Any dissatisfied inventor—whether an individual, firm or corporation—could appeal his case to the board. No limit would be set on the size of the dollar award, and the board would act speedily, the award becoming effective 60 days after the decision.

Interested parties may get copies of the National Inventors Council's resolution and report by writing the council in care of the Commerce Department, Washington 25.

Supply and Demand for Steel . . .

Will the supply-demand balance in the various finished steel products ease up in September and the fourth quarter under CMP programming?

Opinions are mixed in the NPA (see p. 43 for one). Some informed officials say that because CMP allotments have been averaging considerably less than requests, the mills will have more tonnage for sale in the free market than previously. They predict that even the supply of plates and structural shapes will be easier. Others predict that the supply-demand situation will be even tighter. The definite picture will not be known until the NPA Iron & Steel Division's Production Directive Committee (J. S. Smith Jr., on leave from Inland Steel Co., is chairman) completes a series of conferences with the individual steel producers that won't end before late in July.

Each company's order books and rolling schedules are being studied—product by product—and tonnages are being switched from one producer to another when such action is needed to relieve congested schedules. Each company's picture is being studied under four categories—carbon steel, low-alloy high-strength steel, alloy steel and stainless steel.

In studying the order books and rolling schedules full provision is being made for the needs of converter customers.

Foundry Advisory Committee . . .

First foundry industry advisory committee to be called into an organizational meeting by the National Production Authority is the Malleable Iron Castings Industry Advisory Committee. It will meet in Washington July 19; the session will be presided over by A. J. McDonald, Chief, Castings Section, Iron & Steel Division. To be discussed are raw material supply problems, operations under the CMP and the prospects for intensified demands for defense and defense-support purposes.

Multistory Building Research . . .

First move in the new campaign to cut manpower and materials utilization in the building construction field was taken by the Housing & Home Finance Agency. It placed a contract with Illinois Institute of Technology for research on multistory apartment house construction. Findings are to be keyed at first to specific needs of the Chicago Housing Authority. Research work of the institute will be under direction of Elmer I. Fiesenheiser, associate professor of civil engineering.

Two AEC Research Contracts . . .

Among unclassified research contracts just placed by the Atomic Energy Commission are two in the field of metallurgy: At Columbia University, Dr. C. Bonilla is to investigate boiling and condensing of liquid metals; Dr. C. A. Crowley, of the firm of Graham, Crowley & Associates, will study electrotinning of zirconium.

Two expiring metallurgical research contracts were renewed: Dr. Lothar Meyer, University of Chicago, will pursue his study of the structure and properties of graphite; Dr. N. Baenziger, Iowa State University, will conduct further studies on the structure of intermetallic compounds.

chuman Plan Approval Hits Snag

West Germans balk at the scheme that would pool steel and coal resources of West Europeans. Ruhr wants Allied controls lifted as a condition for its approval

EST GERMANS are balking at the human Plan that would put the el and coal resources of West Gerany, France, Belgium, Luxemburg d Italy under control of an interational authority.

Details of the plan were drawn up a lengthy Paris conference and w await approval by parliaments of e participating countries. The West erman legislature may show a rectance to ratify which, if continued outright refusal, could scotch the ole scheme since the importance the Ruhr's steel and coal resources akes its participation essential.

On Record—The reluctance comes spite the fact that West German ancellor Konrad Adenauer has publy stated he favors the plan. Parment is dragging its feet because a resolution by the German Ecomic Council calling upon the govnment to insist upon Schuman an modifications before it O. K.'s e scheme.

The council wants ratification only all interested powers agree that doption of the Schuman Plan means moval of the Ruhr Authority, the llied Steel Control Group, the Allied curity Board and cessation of all strictions on Ruhr steel capacity d production. The council also inks the Schuman plan should be dopted only if it permits more liber- capital investment in Germany nce the Ruhr has not expanded and odernized as much as some of the her participants. The council insts further that the plan should asre Germany complete freedom in ages and provide that social reforms ready won be safeguarded.

Powerful — The Economic Coun-l, or Bundesrat, is an advisory group which all 11 states of West Gerany are represented. Its views will e noted by parliament, although not ntil after its summer recess.

Motives behind the council's resolions are twofold: A natural desire to et rid of some of the occupation oke and more than a little pique that has not been more fully consulted uring the course of Schuman plan egotiations.

erman Steel Prices May Rise

A three-way wrangle on raising erman steel prices is now going on mong federal government, steel industry and Allied Authority representatives.

Steel men want increases ranging from $8 to $10 a ton. The Allied Authority thus far has declined to permit more than a $1-per-ton boost. Final decision won't come until new coal prices are figured.

The government will move gingerly on the steel price question because it just got its fingers burned on another pricing matter. It had decreed that manufacturers producing for export would have to pay more for their materials than those producing for the domestic market. That ruling aroused such a flare of protest that it was withdrawn.

The 1100 German foundries are hard pressed for scrap. They say they're getting 30 per cent less than they need. The scrap shortage generally is worsening in Germany even though exports have declined. Some 44,000 tons of scrap a month are now being shipped out of the country, in contrast to 110,000 tons a year ago.

Shortages Crimp U.K. Output

Raw material shortages, primarily in scrap, may hold British steel production to 17.9 million net tons, although it has capacity to turn out 18.8 million tons.

Behind that statement—from a government source, the British Treasury—can be seen the battle going on between the government and the British Iron & Steel Federation, a non-government organization that supplies the raw materials used by the U. K. industry. The government charges that the federation is trying to stymie nationalization by deliberately contributing to shortages.

The federation counters that the raw materials shortage is worldwide and that the government is simply looking for an excuse to move in on its activities. It points out that it is sponsoring a scrap drive that is raising an additional 12,000 tons a week. The federation says that the prime cause of the scrap shortage is that it can't import enough. Imports for the five months of this year ending in May amounted to only 310,000 tons, compared with about 1 million tons in the same period last year.

Steel Co. of Wales Ltd. has successfully completed trial runs on its new 80-inch continuous hot strip mill at the Abbey Works. One shift is now being worked; two will start soon.

Sollac Project Nears Completion

The $140 million Sollac project in Lorraine, France—the largest single program the Marshall Plan has aided —begins producing steel next year.

Sollac is short for Societe Lorraine de Laminage Continu (Lorraine Con-

REVERSAL: Dozens of British productivity teams have come to America to learn about U.S. methods, but now the procedure is reversed; representatives of the American pressed metal industry are in Britain to pick up tips. Here, F. C. Greenhill (left) president of Ackin Stamping Co., Toledo, and leader of the U.S. team, is greeted by W. S. Grainger, president of the British Sheet & Strip Metal Users' Technical Association

tinuous Strip Mill Co.), will have headquarters at Hayange, Lorraine, and is a privately owned enterprise. Construction is being carried out in two stages to build a Little Ruhr in northern France. First phase will be the completion next year of a continuous hot strip mill at Seremange with an annual production of 785,000 tons of steel coil during the first year or two, to be increased by half later, and two continuous cold strip mills at Ebange with an annual production of 335,000 tons of light gage sheets and tin plate. Second phase will be completion by the end of 1952 of a coking plant of 84 ovens with a daily capacity of 1800 tons of coal, ingot facilities with a capacity to produce 560,000 tons a year and a blooming mill with an annual capacity of 1,120,000 tons.

Of the seven blast furnaces near Hayange, now producing 785,000 tons of pig iron annually, three will be rebuilt to increase production to an estimated 950,000 tons. Prewar Lorraine imported more than 65 per cent of its coke requirements. That will be reduced by using a new process converting Lorraine coal into a suitable coke.

Foreign Bikes Roll In

Imported units pour into the U.S. loaded with materials no longer available to American producers

AMERICAN bicycle manufacturers are concerned.

Foreign-built bikes—mostly from Britain and Germany—are pouring into the U. S. at a rate 40 or 50 per cent higher than last year, and they're glittering with trim and loaded with metals domestic makers can no longer put on their products. Some 3400 were imported in July, 1950; perhaps 5000 this July. Now being prepared is an appeal to the Tariff Commission for protection against increasing receipts of "extremely low priced merchandise."

Comprising—The bicycle industry consists of ten manufacturers who do the prime assembly work and about 250 others engaged in the manufacture of parts and various components, including tires. Because of materials shortages, its sales volume this year is expected to be 1.5 million to 1.7 million units, compared with 2 million in 1950. Sales in 1949 were nearly 2 million, although only 1.6 million were made. In 1948, the peak production of 2,750,000 could not all be sold and some were carried in inventory and sold in 1949.

If materials were available, the industry could sell 15 or 20 per cent more bikes this year than last. The Korean war affected bike sales just as it did everything else; 1,350,000 of the 2 million units sold last year were turned out in the last six months.

Into Defense—Bicycle manufacturers have thus far not entered defense work extensively, although they are pumping harder for government contracts. During World War II they made submachine gun parts, shell cases, tripods and related items. Because most makers concentrate largely on assembly work, they are best equipped in defense for punch press, light machining and assembly jobs.

Although a small industry—it rarely uses more than 100,000 tons of steel in a year—it is a productive one, and in World War II received more government awards to that effect than any other one of comparable size. It has turned out millions of bicycles over the years; 20 million of them are in America today, compared with 36 million passenger cars.

Authenticated

FRENCH BIKEMAKER BUSY: Motobecane, one of the largest producers of bicycles and motor bicycles in France, is working its assembly lines at full capacity. The bicycle, traditional means of transportation in France, is in constant demand, and export shipments are large. Pictured is Motobecane's motor assembly lines at Pantin

Austria To Produce More Ore

More iron ore is due from Austria. The famed Erzberg deposits will be developed so production can be raised to more than 8000 tons a day.

An earlier Marshall Plan project, in May, 1949, had been approved to boost the capacity to 6000 tons daily.

Dresser Reaffirms Plans

Dresser Industries Inc., Dallas, has reaffirmed its plant expansion plans of about $4 million and additional sums for product development after its executive committee reviewed current economic conditions and foreign developments. Dresser, a big supplier of equipment to the oil industry, had a backlog on June 30 of $60 million, $30 million up from last October, says H. N. Mallon, Dresser president.

The company was awarded several military projects and government assistance in the form of certificates of necessity for fast amortization of plant costs. One of those covers $1.5 million in new facilities for Roots-Connersville Blower Corp., Connersville, Ind., a Dresser subsidiary. Funds will be used for design and construction of large centrifugal blowers. Another certificate of necessity (for about $1 million) was issued to Dresser Mfg. Division, located in Bradford, Pa., for manufacture of high-alloy stainless steel rings for jet engines.

Another Dresser expansion project: Development and manufacture by Clark Bros. Co., Olean, N. Y., of a new gas turbine for long distance pipe lines.

Coleman Picks Up Slack

Coleman Co. Inc., Wichita, Kans., manufacturer of gasoline household appliances and home heating equipment, is picking up slack in civilian business by a $10 million backlog in defense orders. Defense work breaks down to 40 per cent quartermaster items like portable lanterns and cookstoves (essentially the same as Cole-

.n's civilian line) and 60 per cent ecision-built aircraft components. A ostantial subcontract from Boeing rcraft for landing gear doors won't : going until early 1952.

The civilian business silhouette apes up like this: Sales are running ead of last year; but earnings will obably take a downward thrust be- use of excess profits taxes, higher sts. From current indications sales ould climb above 1950's $36,794,000 almost $3 million. Purchases on aler and consumer levels for heat- g equipment, particularly, ran ahead last year for the first two quar- s, but they may slacken off some- at in the second half. Peak sales onths lie ahead: Big sales to deal- s usually occur in July and August. Production of heating units is run- ng at only 60 per cent of capacity mainly because of materials short- es. Coleman will have to continue scramble for steel until the fourth arter when it becomes eligible for locations under CMP. The company as declared an essential defense- pporting industry.

Coleman officials think they will ake about 75 per cent of their andard line units compared to last ar. Current inventories of finished oducts are down about 25 per cent om last year's levels.

hristil Tells About Itself

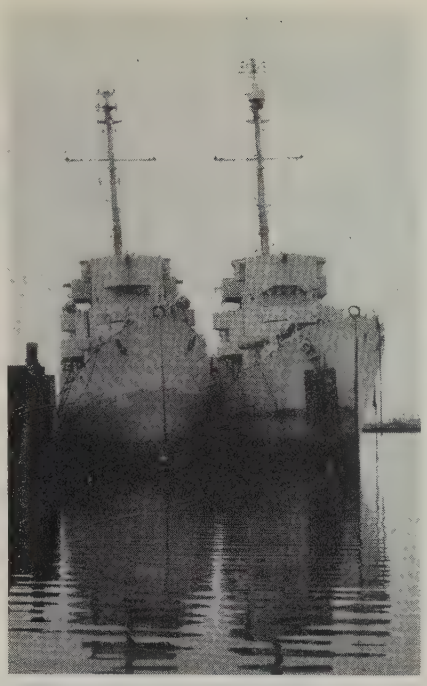
J. H. Christil Co., Edgerton, O., etal fabricator, produced a little ochure that it describes as a means which it, a small manufacturer, ays in business. The 20-page pub- cation describes and pictures Chris- l's tools and equipment and the way e company is run. Christil—famous r its colored (anodized) aluminum mblers that started the company lling—does subcontract work in the efense program. Says Roger Priest, eneral sales manager: "So far we re successful. We are doing work r four prime contractors."

crap Hearing Date Postponed

The hearing before the Interstate ommerce Commission on the peti- on of the Institute of Scrap Iron & teel for a reduced freight rate on ars of scrap loaded to 80,000 pounds r heavier was postponed from July 4 for 60 days.

'EI Starts Scrap Drive

The Government Business Commit- ee of the Porcelain Enamel Insti- ute, Washington, started a three- ronged scrap drive among its mem- ers. The program: Searching out ormant scrap like obsolete machin-



FLOTSAM: Fontana-bound are these two destroyer escort vessels, the first of six that will be broken up for scrap by Kaiser Steel Corp. Weighing about 800 tons each, the obsolete vessels will provide nearly 5000 tons of scrap for Kaiser's hungry open hearths. Continued high rate of steel production in the West has made heavy inroads on scrap supplies

ery, tools, etc.; consideration of wrecking or dismantling projects that will produce scrap; and release of all production and dormant scrap into normal scrap channels.

Armco Adds Annealing Furnaces

Heavy demands for the special grade of steel produced by electric furnaces made necessary the expansion of electric steel capacity at the Butler, Pa., division of Armco Steel Corp., Middletown, O. Construction began on a $2 million project, W. W. Sebald announces. A battery of new annealing furnaces is being built and equipment such as new shears is being added to process the steel. About 10 months' work should see the new project completed.

Good News for Coast Foundries

Approval by the National Production Authority of tax benefits of $54,939,000 to Kaiser Steel Corp. (STEEL, July 9, p. 43) comes as good news for West Coast foundries. Expansion of Kaiser's Fontana, Calif., plant will be largely in the pig iron making department; Pacific Coast foundries for months have been squeezed by tight iron supplies.

Installation of a third Kaiser blast furnace is expected to make some pig iron available for the general market —over and above Kaiser Steel's needs.

Estimates indicate the coast has a deficit of between 1000 and 2000 tons daily in pig iron.

But one question facing the long-term pig iron problem in the West is that of iron ore. Kaiser has proved and probable reserves at Eagle Mountain and Silver Lake sufficient for a minimum of 27 years at a consumption rate of 1.5 million tons per year —if only two blast furnaces are in operation. A third blast furnace would trim down the longevity. Next possible source for ore: Mexico.

Transfers in Navy BuShips

Capt. Richard H. Lambert, long time head, Welding, Casting & Forging Branch, Ship Technical Division, Navy Bureau of Ships, and assistant for metallurgy, Materials Development Division, Bureau of Ships, was transferred from Washington to become shop superintendent, Philadelphia Naval Ship Yard.

Lt. F. L. Doty, temporarily is in charge of the Welding, Castings & Forging Branch, and will serve as assistant to Lt. Cdr. M. N. P. Hinkamp when the latter, sometime in July, takes over as head of the branch.

Capt. Lambert's duties as assistant for metallurgy, Materials Development Division, will be taken over sometime in August by Cdr. John B. Guerry.

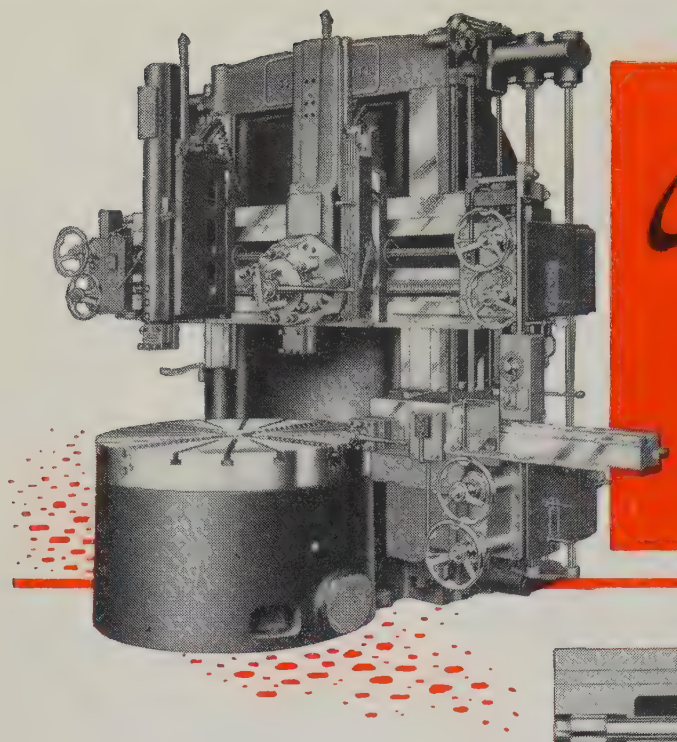
All those officers are full-fledged metallurgists, having taken post-graduate courses at Carnegie Institute of Technology, following graduation from Annapolis.

RFC Approves 23 Loans

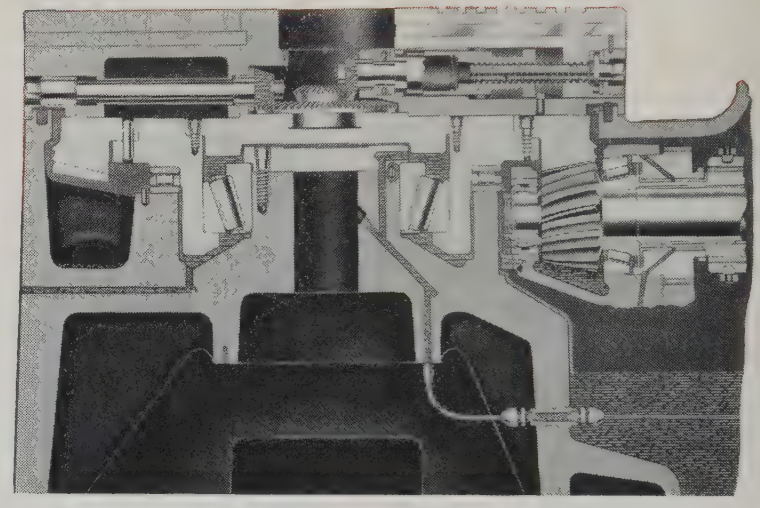
Last Reconstruction Finance Corp. loans to be approved through regional offices of the lending agency were recorded in the week ended June 27. After that date, new policy will have all loans cleared through Washington headquarters. Loans approved in this period numbered 23 and totaled $1,461,506.

In the same period, 40 other applications amounting to more than $15 million were turned down.

Of those approved, only five were for $100,000 or more. Largest amounts of $250,000 each went to Ekstrom Carlson & Co. of Rockford, Ill., wood and metalworking tool maker, for machinery and working capital and to S. J. Miller Packing Co. of Grand Junction, Colo., food packing company, for operating expenses.



Refinement in DESIGN



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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Automakers are plagued by uncertainties—in materials, markets, new models, costs and defense orders. They're particularly uneasy about markets

DETROIT

AT NO time in the last six years has the automotive industry been so unsure of itself. It doesn't know: 1. Where its materials are coming from; 2. what its market is; 3. what it can do about new models; 4. how it can keep costs in line; 5. whether its defense orders will hold.

Disagreement—Despite the all-out campaign by mobilization officials to convince the country that the danger is still "clear and present," Detroit is of the opinion that a letdown in civilian buying and in the defense tempo will come in the wake of a Korean truce. Should this happen questions 1 and 3 will take care of themselves, and 2 and 5 become the overwhelming ones. If the administration is right and an uneasy peace does not materially lessen the danger of inflation or slow the urgency of rearmament, the points of worry for automakers are reversed.

As an indication of the uncertainty prevalent, one large auto producer last week was canvassing its suppliers to find out if they were adequately covered on steel for final quarter. Asked by one of these what the automaker's requirements will be, the auto producer's buyer was unable to give an answer. But officials of that same company, have indicated to STEEL that they are willing to bet scarce materials will come out of hiding immediately upon a Korean cease-fire. So, while purchasers are trying frantically to make sure their supplies are in sight, top management expects an easing in procurement problems. Neither knows even approximately how many units they can sell if they get their materials.

Cost Problem Remains — For all concerned the cost problem is ever-present. Although there was never any indication from management that it would like to welsh on the annual improvement factor (it, in fact, teamed up with labor to win WSB approval of the raise), happenings this year have been such that this contract provision would not come first in a popularity poll. Most of the labor disturbances among UAW-organized plants stem from complaints of speed-up and attempts to get the same production with a smaller labor force.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,878
February	658,918	505,593
March	802,737	610,680
April	680,216	585,705
May	696,039	732,161
June	652,788*	897,853
July		746,801
August		842,335
September		760,847
October		796,010
November		633,874
December		671,622

Week Ended	1951	1950
June 23	158,909	205,334
June 30	156,105	197,767
July 7	102,127	137,731
July 14	143,000*	194,073

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Chrysler President L. L. Colbert felt obliged to remind that company's employees, through their monthly magazine, just what obligations go with that pay raise. He wrote: "The theory behind the improvement factor is that by making our brains and machines take over more and more of the work that used to be done with our hands everybody will benefit—employees, owners and people who buy our products."

Quote — Quoting the contract's terms which state, "To produce more with the same amount of human effort is a sound economic and social objective," Tex Colbert went on to say "but we cannot—any of us—attain this objective of better living for all unless we take advantage of better tools, methods and equipment. Your pay increase of 4 cents an hour—and subsequent increases as provided for in our agreement with the UAW-CIO—is based on the expectation that Chrysler can produce more with the same amount of human effort.

"Otherwise the improvement factor becomes an unreal theory. If increased production is not forthcoming, any improvement-factor increases would contribute to inflation and make your dollar buy less—no one would benefit. The success of the improvement factor depends on how effectively we all make it work. ."

Employment the Problem — It doesn't take knowledge of differential calculus to figure that the government-directed reduction in automobile production is interfering at least temporarily with the ideal operation of the theory. Tex Colbert asserts that the theory "does not mean fewer jobs. It means more jobs." For the moment, however, because of materials limitations these jobs are not in civilian industry. That basically is the reason for the clamor which is resulting in Sen. Blair Moody's investigation into industry's problems. (STEEL, July 9, p. 57.)

The probe, which will locate around the steel shortage but will not be limited to that phase of the transitional turmoil in which industry now finds itself, began on Saturday with a group of small manufacturers testifying. Automakers, at this point, have few firm convictions about the effect of the investigation. Most view it with considerable skepticism but hope fervently that it will produce some vitally needed answers to their problem.

"Long overdue" seems to be the general feeling by manufacturers toward the hearings.

Union Officials Can't Wait

Unwilling to wait for these hearings before airing their complaints was a group of Chrysler union local presidents headed by Norman Matthews, director of the UAW-CIO's Chrysler department. They descended on Washington en masse Tuesday for meetings with Manly Fleischmann and Courtney Johnson of NPA, defense mobilizer C. E. Wilson, and congressmen from their respective areas to tell them what should be done to minimize drastic mass unemployment which they contend is now beginning.

The steel industry got their concerted fire, the unionists once again accusing it of planning insufficient expansion.

They carried the torch for quick adoption of Walter Reuther's proposal (STEEL, July 9, p. 57) for increased machine tool production, and reiterated the demand that Congress should enact a law supplementing state unemployment compensation with federal benefits to bring workers a full 40-hour-week's pay through-

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out any unemployed period resulting from transitional lay-offs.

Unemployment Worries Breech

Their contention that increasing unemployment is a serious problem has been bolstered by Ford's executive vice president, Ernest R. Breech, who last week stated, "There will be considerable unemployment in the period between the reduction of civilian production and full-fledged defense production." Mr. Breech is of the mind that sometime in the next 18 months the crest of the unemployment flood will pass.

This is the picture he sees: Automobile production for the rest of 1951 "settled pretty definitely" by NPA order M-68. Ford, Lincoln and Mercury production in third quarter approximately 256,000 units, 37 per cent under third quarter last year. Further reductions in 1952 probable. Then in 1953 "the major phase of Ford's defense program will reach its peak." He makes no prediction as to whether automobile production will then also turn upward, but suggests reduced output this year and next "creates the possibility that supply will not match the requirements of car-buying America." A pent-up demand, not unlike that which followed World War II, is again in store, he believes. It will be several years, he predicts, before this demand is met.

Trend Toward Lighter Cars?

Indication that NPA may be getting its wish that automakers concentrate more heavily on lighter cars is beginning to be seen faintly. Order M-68 provided flexibility in production for this purpose. Nash, for one, has increased its percentage of Ramblers to about 40 per cent of total production and step-up in the new Rambler hard-top convertible's production undoubtedly will be at the expense of the larger models. The time is getting ripe for Willys-Overland to come out with a small but conventional passenger car. A spokesman for the company admits that such a car is definitely in its forward thinking but also disclaims knowledge of when it will be introduced.

Suppliers who now have orders for components of this car, however, believe that early fall production of the new design is a certainty. It is assumed the first body style will be a two-door five-passenger sedan, and another model will follow.

Barney Roos, W-O first vice president, is a foremost exponent of the smaller car. Carefully engineered to provide equivalent transportation, safety and driving ease, such cars can make a good case for themselves in terms of materials-fuel savings.

Detractors from such cars in the 2500-lb class hold firm in the belief that "it costs just as much to hang a bumper on them as on the larger ones," meaning that the savings in materials costs are relatively small, and the labor expense is little different between the two sizes. The idea is firmly implanted, furthermore, in most automakers minds that any price reduction that might be possible with really large-scale production of such cars, would not approach that which is offered by the used-car market for standard size vehicles. This decision has been reached every time one of the large makers looks into the small-car possibility. Shelving and unshelving of new light car plans, however, continues to be a periodic experience for the market research and production analysts in several major companies.

Helping make the introduction date of the new Willys car uncertain is the strike at the company's transmission supplier, Spicer Mfg. Div., Dana Corp. Willys has had to stop production entirely, and last week recalled about 4000, less than half of its force, for the purpose of inventorying, a week-long job. Its parts inventory will be conducted the last week of August.

Dana isn't taking the strike sitting down. After the UAW brought suit against the company for $500,000, claimed as back pay and bonuses for the strikers, the company retaliated with a $1 million suit, with additional damages claimed of $100,000 for each day of the strike's duration. The company charges the UAW is unlawfully interfering with operation of other plants outside of Toledo.

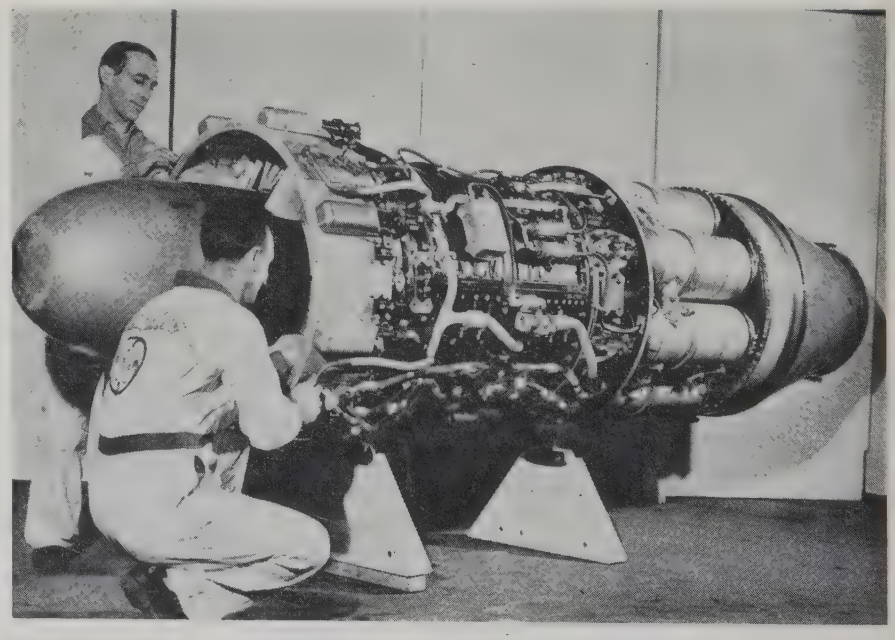
Other labor disputes, most of them in Chrysler Division plants in Detroit, idled an estimated 22,000 autoworkers at various times last week. Hudson continues to have its daily shutdown.

K-F Readies Dowagiac Plant

Kaiser-Frazer has announced its intentions concerning the former Round Oak Stove Co. foundry and machine shop at Dowagiac, Mich., purchased by K-F in 1947 but idle for a considerable time. The plant will be used by the company's engine division for production of components for Wright R-1300 aircraft engines, which are to be assembled in the Detroit facility of the division.

The Dowagiac facility will be equipped to perform about 47 percent of the machining operations on the 800-horsepower engine. Extensive rearrangement of the shop is necessary before production.

At Detroit, the engine facility which K-F bought from Continental Motors early this year is being tooled so that automobile and aircraft engines can both be produced. Tools from Air Force stocks are being brought in for the defense work, and present schedule calls for initial output of the training-plane engine in January.



ASK THE MAN WHO FLIES ONE: The Boeing B-47 Stratojet will take up Packard Motor Car Co.'s entire output of all-weather turbojet engines. The General Electric J-47-GE-23, which will be built on a new 700,000 square foot facility adjoining Packard Proving Grounds near Utica, Mich., is rated at more than 5800 pounds of thrust—over 600 pounds more than previously reported

The Business Trend

Industry snaps back into stride after holiday layoff takes big bite out of production and drops activity index near year's low mark

BUSINESS as usual—if business in the past six months or so can be called usual—will be the watchword for industry during the coming "peace emergency." Even with the shooting stopped, the wheels of industry will be kept spinning fast on power from the military budget. Notwithstanding a probable readjustment of defense sights to cold war targets, the armament program is here to stay. It will prop up business activity for a long time to come.

Summer doldrums, once a common occurrence in industry, are becoming another relic of the past as artificial and natural booms force full year-round operations. The Federal Reserve Board's index of industrial production for the first three weeks of June matched the record peacetime mark of May at 223 per cent of the 1935-1939 average. Production in durable goods industries has remained unchanged since March. This pattern is likely to continue through the summer, with no significant rise in output till the vacation season ends. A gradual acceleration of output should start in September.

With most of industry taking a break on Independence Day, output totals for the week nose-dived. STEEL's industrial activity index for the week ended July 7 recorded the second-lowest mark of the year: 193 per cent of the 1936-1939 average. The week before the index was at 220. In the comparative week of 1950, the mark plummeted to 178 from 216.

Steel Pace Steady . . .

Tempering the sharp output drop because of the holiday was another week of above capacity operations in steel mills as most producers paid premium wages to maintain momentum. In the week ended July 14 steelmaking furnaces were scheduled to turn out about 2,029,000 tons of ingots and steel for castings, up 14,000 tons from the preceding week. More than 2 million tons of steel have been turned out for 19 consecutive weeks. A year ago 1,830,000 tons were poured.

Auto Assemblies Slump . . .

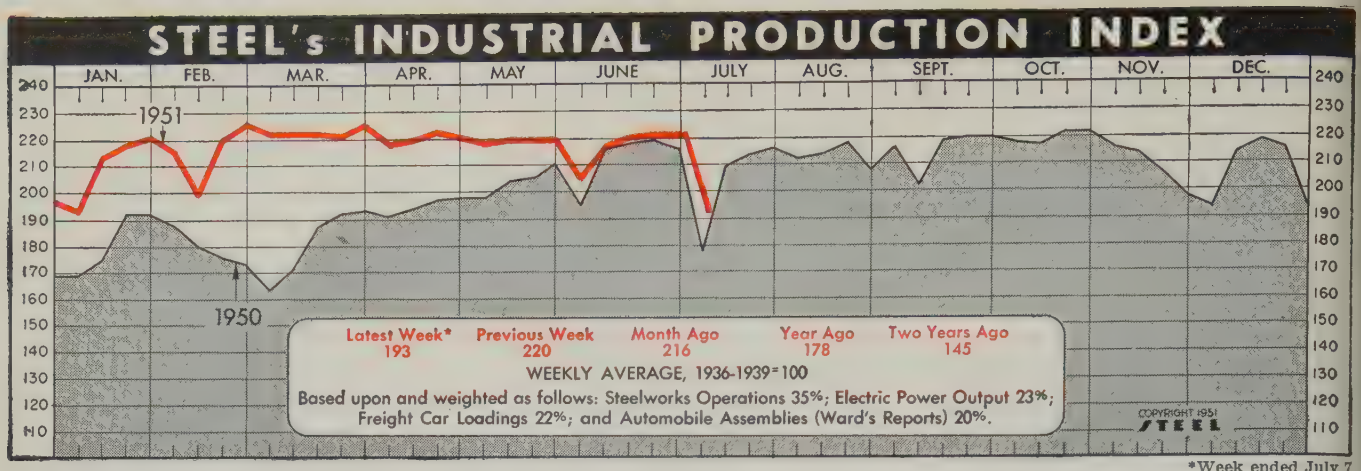
The shape of things to come was seen by automakers in the holiday week as they rang up their second-lowest assembly total since December of 1949. Only 102,127 autos and trucks were assembled by U. S. and Canadian producers in that week, ending July 7, as contrasted with 156,105 the week before. Daily assembly was ragged and four producers were almost out of production completely during the week. And the holiday was only a partial cause of the poor showing says *Ward's Automotive Reports*. Output and manpower adjustments made for unsettled operations generally as the industry began gearing its manufacturing to a July level about 14 per cent under June. Little stability in third-quarter assemblies is foreseen by *Ward's*.

June Construction High . . .

A whopping $2.7 billion was spent for new construction in June, according to estimates of the Departments of Labor and Commerce. The total was 6 per cent over May. All types

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	103.0	103.0	94.0
	Electric Power Distributed (million kilowatt hours)	6,077	6,898	6,734	5,380
	Bituminous Coal Production (daily av.—1000 tons)	1,760	1,839	1,437	1,697
	Petroleum Production (daily av.—1000 bbl)	6,169	6,181	4,168	5,475
	Construction Volume (ENR—Unit $1,000,000)	$404.7	$316.7	$296.0	$214.4
	Automobile and Truck Output (Ward's—number units)	102,127	156,105	152,656	137,731
	* Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	740†	822	813	554
	Business Failures (Dun & Bradstreet, number)	129	188	172	138
	Currency in Circulation (in millions of dollars)‡	$27,948	$27,601	$27,520	$27,315
	Department Store Sales (changes from like wk. a yr. ago)‡	−2%	+6%	+5%	+10%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,661	$16,610	$17,050	$13,031
	Federal Gross Debt (billions)	$254.7	$254.4	$254.6	$257.2
	Bond Volume, NYSE (millions)	$10.2	$14.4	$13.1	$16.0
	Stocks Sales, NYSE (thousands of shares)	5,183	8,724	5,829	6,374
	Loans and Investments (billions)†	$70.6	$70.4	$69.4	$68.0
	United States Gov't. Obligations Held (millions)†	$31,176	$31,186	$30,443	$36,638
	†Member banks, Federal Reserve System.				
PRICES	STEEL'S Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.69
	STEEL'S Nonferrous Metal Price Index‡	226.0	226.0	239.1	184.0
	All Commodities†	180.5	180.8	181.9	159.6
	Metals and Metal Products†	188.2	188.2	189.3	172.0
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

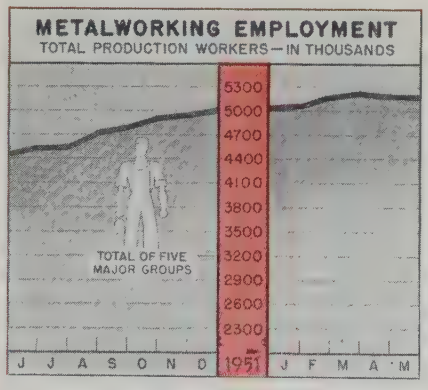


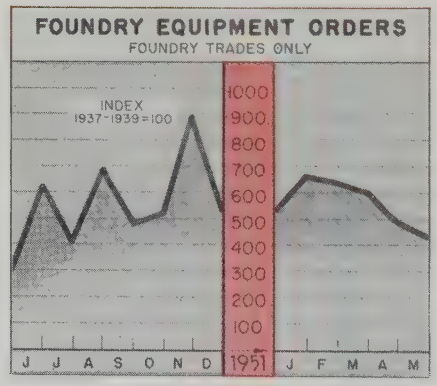
*Week ended July 7

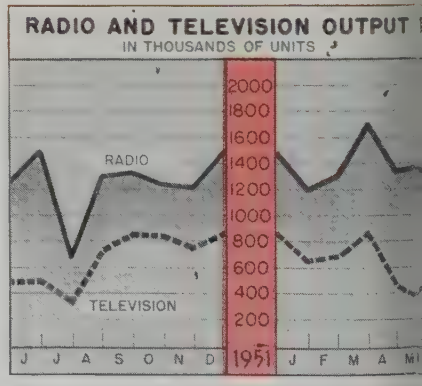
of construction expenditures recorded a gain with the exception of commercial building which was beginning to show the effects of tight controls. Private housing though at a high level was down 23 per cent from June of 1950, and is largely responsible for the 4 per cent decrease in the total for all private construction expenditures. For the first six months of 1951, nearly $14 billion has been spent, up 16 per cent from the same period last year and higher than any comparable period in history. Industrial construction, up $740 billion, accounts for much of the gain. On a weekly basis, heavy construction awards of $404,655,000 in the week ended July 5 make it the fifth highest total for the year. This is 89 per cent higher than the same week last year, says *Engineering News-Record.*

Coal Stocks Near Peak . . .

An eight-year peak in stocks of bituminous coal was reached on June 1 with a total of 74,807,000 net tons on hand, according to Bureau of Mines figures. The all-time high of more than 90 million tons was set in November, 1942. Industrial consumption and retail dealer deliveries are on the warm-weather downgrade as consumption in May dipped to 33,737,000 tons. This compares with 36,031,000 the previous month and 34,031,000 in May, 1950. On the first of June there was enough bituminous coal on hand to last 69 days at the current rate of consumption, with electric utilities topping the field with 121 days supply. But 1951 will see a rise of over 6 per cent in coal usage, says Appalachian Coals Inc., marketing agency. It estimates consumption this year at 481,331,000 tons compared to 453,113,000 tons used in 1950. It also estimates production will be up nearly 4 per cent to 531 million tons, as against last year's 512 million tons. Electric utilities will gobble up most of the increase. Bituminous Coal Institute says that







Metalworking Employment

Production Workers—Five Major Groups

1950	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mch.	Trans. Equip.
May	1,026	742	1,022	606	1,045
June	1,050	769	1,033	615	1,078
July	1,054	773	1,032	620	1,070
Aug.	1,086	814	1,060	655	1,118
Sept.	1,105	837	1,050	673	1,134
Oct.	1,117	850	1,104	710	1,157
Nov.	1,125	849	1,133	720	1,128
Dec.	1,142	852	1,163	724	1,160
1951					
Jan.	1,149	847	1,192	711	1,175
Feb.	1,153	853	1,219	716	1,228
Mar.	1,158	858	1,228	724	1,259
Apr.	1,159	858	1,234	717	1,244
May	1,161	848	1,245	706	1,221

U. S. Bureau of Labor Statistics

Foundry Equipment Orders

	Index 1951	Index 1950	Value in Thousands 1951	Value in Thousands 1950
Jan.	668.0	159.3	$3,075	$731
Feb.	638.6	113.1	2,940	519
Mar.	599.0	225.2	2,758	1,034
Apr.	490.1	160.6*	2,256	737
May	431.7	294.9	1,987	1,353
June	....	622.7	....	2,858
July	....	401.8	....	1,844
Aug.	....	693.6	....	3,183
Sept.	....	483.8	....	2,220
Oct.	....	516.8	....	2,417
Nov.	....	885.5	....	4,077
Dec.	....	526.2	....	2,412

Foundry Equipment Mfrs. Assoc.

Radio and Television Output

Thousands of Units

	Radio 1951	Radio 1950	Television 1951	Television 1950
Jan.	1,203	935	646	439
Feb.	1,313	1,059	679	480
Mar.	1,720	1,349	875	687
Apr.	1,337	1,254	469	543
May	1,373	1,245	339	486
June	....	1,491	...	502
July	....	666	...	327
Aug.	....	1,304	...	721
Sept.	....	1,335	...	844
Oct.	....	1,230	...	838
Nov.	....	1,216	...	739
Dec.	....	1,506	...	858
Total	....	14,590	...	7,464

Radio-Television Mfrs. Assoc.

Charts—Copyright 1951, STEEL

ectric utilities coal consumption for e year will pass the 100 million n mark at present rates. Depart- ent of the Interior reports first lf bituminous production totaled 6,232,000 tons, up 13 per cent from 50. Anthracite production dropped 19,781,000 tons from 22,224,000 ns the year before.

Wholesale Prices Ease . . .

Wholesale prices eased off for the fth week in a row in the week ded July 3, says the Bureau of abor Statistics. Its index of aver- ge primary market prices, at 180.5 er cent of the 1926 average, was 9 percentage points below the mark the general price freeze in Janu- ry. The index is still about 15 per ent above the pre-Korea average, nd is expected to start edging up- ard again in the fall.

Work Stoppages Low . . .

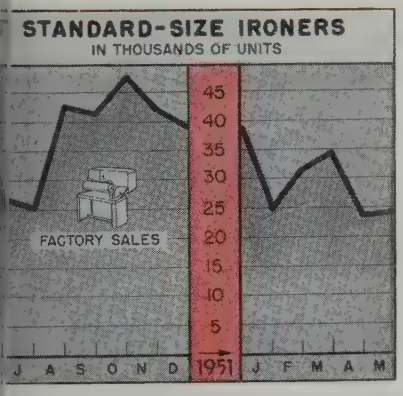
Labor unrest, often stirred up in imes of economic transition, is re- markably low. Bureau of Labor Sta- istics figures show work stoppages in May totaled 400, which was an increase over each of the past three months. Considering the auto work- ers' and textile mill stoppages in that month, the figure points up the high degree of labor stability in the nation. Total number of workers en- gaged in the May stoppages decreased from 165,000 in April to 150,000.

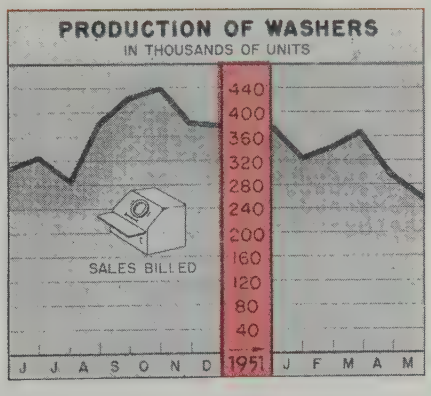
Trends Fore and Aft . . .

Overall business inventories on the first of June stood at $69.7 billion . . . Railroad freight car production in June remained at about the May level with 9644 cars delivered. Do- mestic freight car orders in June of 6793 brought total backlogs on July 1 to 147,725 . . . The American Appraisal Co.'s construction cost in- dex rose 3 points in June to a high of 531 per cent of the 1913 average, an increase of 14 points this year . . . The oil industry will spend $4 billion this year for new construction and re- placement of facilities. Year-end ca- pacity should be nearly 7,062,000 barrels daily . . . Domestic airlines on June 30 wound up the best half- year earnings period in their history.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction June25	Gray Iron Castings..July9	Ranges, Gas June4
Durable Goods July2	Indus. Production ..June25	Refrigerators June18
Employ., Steel June25	Machine Tools July2	Steel Castings July9
Fab. Struc. Steel....June4	Malleable Castings ..July9	Steel Forgings July2
Freight Cars June18	Prices June25	Steel Shipments July2
Furnaces, Indus. July2	Pumps, New Orders..July9	Vacuum Cleaners ...June4
Furnaces, W. Air...May28	Purchasing Power ...June4	Wages, Metalwkg...June18
Gear Sales July9	Ranges, Elec. June11	Water Heaters June25





Standard-Size Ironers
Factory Sales—Units

	1951	1950	1949
Jan.	24,600	20,300	28,300
Feb.	32,400	27,600	28,400
Mar.	34,700	37,800	23,800
Apr.	23,700	31,600	18,100
May	24,200	27,400	19,500
June	.....	27,100	21,100
July	.....	25,100	17,700
Aug.	.....	42,700	32,300
Sept.	.....	41,400	27,700
Oct.	.....	47,500	36,045
Nov.	.....	41,900	35,000
Dec.	.....	38,800	19,400
Total ..	.....	409,200	307,345

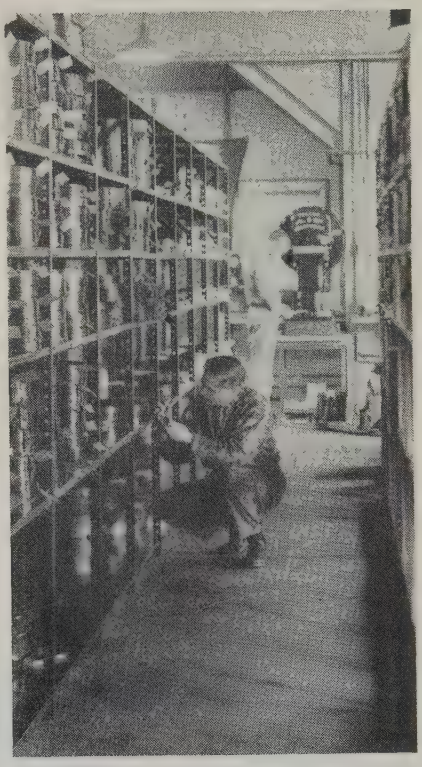
American Home Laundry Mfrs. Assoc.

Household Washers
Sales Billed—Units

	1951	1950	1949
Jan.	321,092	275,576	172,400
Feb.	341,328	342,967	201,300
Mar.	368,455	423,802	242,500
Apr.	292,193	333,072	192,500
May	253,942	304,640	211,700
June	.....	325,217	260,700
July	.....	282,261	200,900
Aug.	.....	381,452	323,789
Sept.	.....	424,043	357,281
Oct.	.....	439,924	333,728
Nov.	.....	379,964	298,717
Dec.	.....	377,013	237,591
Totals ...	.....	4,289,931	3,033,106

American Home Laundry Mfrs. Assoc.

is spring steel up your alley?



. . . ours too

Pictured is just one of the aisles in Kenilworth's specialized spring steel stock department; here you see a portion of the wide variety of types, sizes and finishes (annealed or tempered) always on hand. Whatever your requirements, however small, Kenilworth can handle your orders quickly. You are assured of uniform end results plus Kenilworth's accurate meeting of specifications in shipment after shipment. Your inquiries are invited.

THE Kenilworth Steel co.
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KENILWORTH, N. J.

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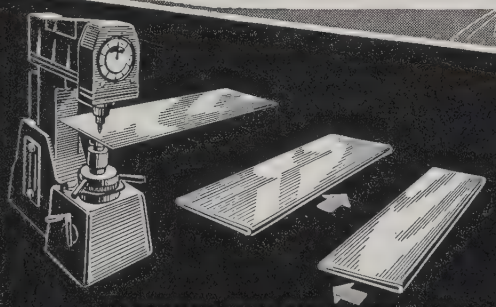
ROUGH
ON RAW MATERIALS

Quality of materials has a lot to do with the quality of fasteners produced for your products. That's why every coil of spring steel, every shipment of finishing paints and chemicals and every material required for the manufacture of SPEED NUTS is subjected to rigid "entrance exams."

The primary raw material, steel, gets the most intensive checkout. Four laboratory procedures must be conducted on samples from every steel lot. Bend Test; Metallographic Analysis; Heat-Treat Cycle Test; and Thickness Tolerance Test.

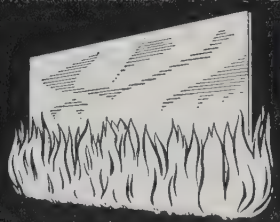
Raw materials testing is Stage One in Tinnerman's program to guarantee you highest quality SPEED NUT brand fasteners for all types of attachments. Follow your fasteners through all stages of Tinnerman quality control . . . write for your copy of "Story of Quality", new 20-page booklet.

TINNERMAN PRODUCTS, INC., Box 6688, Dept. 12, Cleveland 1, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales.

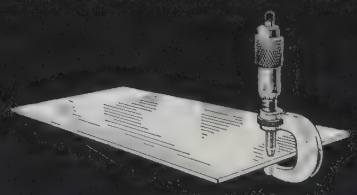


HARDNESS AND BEND TEST—Hardness is checked to insure against fracturing; then samples are bent 180° in two directions to determine ductility.

METALLOGRAPHIC ANALYSIS—Microscopic inspection determines internal structure of samples mounted in plastic for examination.



HEAT TREAT CYCLE TEST proves capacity of samples to harden and draw to spring steel qualities.



THICKNESS TOLERANCE TEST—All steel received is subjected to minute dimension checks to maintain rigid tolerance requirements.

TINNERMAN Speed Nuts®

*Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

Men of Industry

ROY P. TOOKE
. . . Armco mgr., Butler Div.

E. F. ALLISON
. . . sales mgr., Deringer Metallu.gical

J. P. HAIGHT
. . . Alcoa's fabricating gen. mgr.

Roy P. Tooke was appointed manager and **E. T. Mitchell,** general superintendent, Butler Division, Butler, Pa., **Armco Steel Corp.** Mr. Tooke succeeds the late **J. Gordon Gage.** He was previously general superintendent.

Frederic B. Stevens Inc., Detroit, has added **Thomas R. Williams** to its sales staff to represent the firm in eastern Ohio. As sales engineer in its plating and polishing department, he will have headquarters at Elyria, O. He formerly was a laboratory technician with Brown-Lipe-Chapin Division, General Motors Corp.

John P. Courtright was elected executive vice president of **Marion Power Shovel Co.,** Marion, O. He was made vice president in charge of sales in 1941, and continues in that position.

Lawrence E. Moore, controller of Vanadium-Alloys Steel Co., Latrobe, Pa., was elected a director of **Pittsburgh Control** of Controllers Institute of America.

Paul M. Nash was appointed chief engineer, Highland Park plant, Detroit, **Chrysler Corp.** He succeeds **Arthur H. Fries,** recently made works manager of that plant.

David J. Gemmell has resigned as executive vice president and director of sales of **Cleveland Chain & Mfg. Co.,** Cleveland. He joined the company in 1929, and previously was with United States Chain & Forging Co. for ten years.

R. W. Allen was named district manager, St. Louis branch, **Mack Motor Truck Corp.**

E. F. Allison joined **Deringer Metallurgical Corp.,** Schiller Park, Ill., as sales manager. He has been associated with metallurgical firms in the Midwest for the last 15 years.

James A. Mason, chief project engineer, Warner Electric Brake & Clutch Co., Beloit, Wis., has transferred to **Machinery Electrification Inc.,** Worcester, Mass., the New England outlet for the Warner line of industrial electric brakes and clutches.

Jordan D. Wood was appointed public relations manager, **Jones & Lamson Machine Co.,** Springfield, Vt.

John W. Gething was elected vice president, **Laclede Steel Co.,** with headquarters in the Arcade building, St. Louis. Associated with the company 35 years, he served as general superintendent for the last ten years.

Dean P. Hayes, formerly assistant sales manager, plastics division, **Modglin Co. Inc.,** Los Angeles, was named to the newly created post of staff assistant, metal products division. He will assist **M. G. Simpson,** manager of that division.

C. P. Harlow was appointed to succeed **Bill Sewert,** resigned, as hardware products sales manager, **Wickwire Spencer Steel Division,** Colorado Fuel & Iron Corp., New York. **William B. Kempton** continues as assistant hardware products sales manager. Mr. Harlow was assistant district sales manager, Boston office. Both he and Mr. Kempton continue to be located in the new sales office of the hardware products department at the corporation's subsidiary, American Wire Fabrics Corp., Mt. Wolf, Pa.

J. P. Haight was named general manager of **Aluminum Co. of America's** fabricating division, Pittsburgh, where, since 1947, he has been assistant general manager. In his new position he succeeds **R. R. Stevenson** who will retire in the near future, and whose services will be made available to the company for the next few months. Mr. Haight joined Alcoa in 1920.

G. E. Gunther was appointed assistant sales manager, **Thew Shovel Co.,** Lorain, O. He formerly was a district sales manager, central territory.

I. Melville Stein was elected to the newly created post of executive vice president, **Leeds & Northrup Co.,** Philadelphia. Mr. Stein has been a vice president, and is director of research.

Jones & Laughlin Steel Corp., Pittsburgh, announces retirement of **W. H. Dupka** as a vice president and director, and a member of the executive committee of the corporation. He has been associated with J&L since 1923.

Luther Harris was elected vice president-production, **Pacific Airmotive Corp.,** Burbank, Calif.

Three new vice presidents elected by **Double Seal Ring Co.,** Ft. Worth, Tex., are: **F. S. Goold,** who has been works manager, and is now vice president in charge of production; **R. W. Hoyt,** chief engineer, now vice president and chief engineer; and **Buyrl Wilson,** general sales manager, now vice president in charge of sales. Other promotions include: **D. L. Doherty,** chief accountant, appointed to a newly created position of special assistant to **A. R. Clark,** the firm's vice president

and secretary-treasurer; and **Fran Schmale,** industrial sales manager, made assistant to the newly elected vice president and chief engineer, Mr. Hoyt.

Sheldon R. Harper was placed in charge of sales promotion and advertising for the mechanical goods division of **Goodyear Tire & Rubber Co.,** Akron, to replace **R. W. Sabine,** promoted to manager of the division's distributors sales.

Lt. Gen. Albert C. Wedemeyer, who is retiring as commander of the Sixth Army, with headquarters in San Francisco, will become vice president and director of **Avco Mfg. Co.,** New York, Sept. 1.

Charles L. Campbell was appointed chief engineer, **Centrifix Corp.,** Cleveland. For the last seven years he has been with Diamond Alkali Co., Painesville, O.

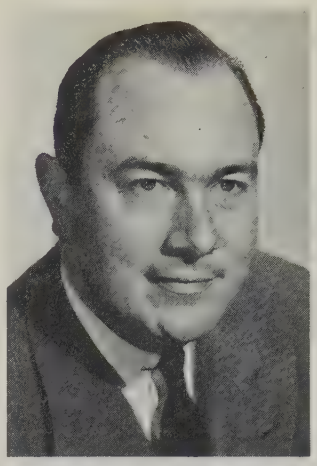
Bob Wagner, who has been narrating and writing **Timken Roller Bearing Co.'s** "Message to Americans" radio program, has joined the advertising department at the Timken plant in Canton, O.

Leighton F. Korb and **J. Franklin Miller** have joined the **Freyn Engineering** Department of Koppers Co. Inc., Chicago, as contract engineers. Mr. Korb previously was general manager of National Steel Co. of Brazil at Volta Redonda, Brazil, from 1944 to 1951. Mr. Miller was with Tata Iron & Steel Corp., in India, as assistant chief engineer and development engineer.

Thomas C. Fogarty, executive vice president, metal division, **Continental Can Co. Inc.,** New York, was elected to the board of directors to fill the vacancy created by resignation of **Sidney J. Steele.**

Gilbert L. Hartmann, formerly vice president and general manager, **Milwaukee Flush Valve Co.,** Milwaukee, was elected president and treasurer to succeed the late **Julius S. Judell. Harry F. Leonard** was elected vice president in charge of sales. **Chester E. Rubringer** is secretary and assistant treasurer.

Plasteel Products Corp., Washington, Pa., named **R. J. Smith** as general sales manager. He previously served in a similar capacity handling steel building products.



ROBERT H. MADDAN JR.
. . . div. V. P., Columbia Steel

Robert H. Maddan Jr. was appointed division vice president, central sales division, **Columbia Steel Co.,** U. S. Steel Corp. subsidiary. He was formerly sales manager-manufacturing accounts, central sales division, and is succeeded by **Alex Walker,** formerly senior technical field representative, same division.

Kenneth S. Thomson was elected president of **Sterling Engine Co.,** Buffalo, succeeding **Frank G. Raichle,** who resigned both as an officer and director. **Leslie D. Calhoun** becomes vice president in charge of engineering.

Herbert B. Link, executive vice president since 1939 of **Bellows Co.,** Akron, was named president to succeed the late L. F. R. Bellows. **L. F. R. Bellows Jr.** was named vice president, and **Byron D. Kuth,** secretary-treasurer. The same officers were likewise named for Bellows Electric Sign Corp. and Bellows Products Inc., affiliated companies.

J. E. BOWEN
. . . a V. P. of Great Lakes Steel

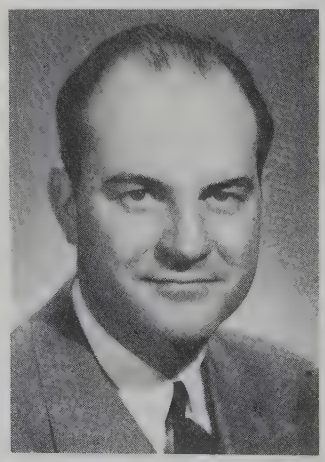
J. E. Bowen was elected a vice president of **Great Lakes Steel Corp.,** Ecorse, Mich. He continues as general manager of the Stran-Steel Division with which he has been affiliated since 1937.

J. D. Brick was appointed district manager of the Pittsburgh office of **Electric Controller & Mfg. Co.**

Consolidated Vultee Aircraft Corp., San Diego, appointed **G. Irwing** manager of its guided missile plant to be built in Pomona, Calif.

Keystone Steel & Wire Co., Peoria, Ill., elected **Walton B. Sommer** vice president, and **Paul W. Sommer,** treasurer. As vice president Mr. Sommer will co-ordinate management problems between Keystone and its subsidiaries. He has been assistant to the president since March. **Paul Sommer,** who has been a vice president since October, 1950, succeeds **W. O. Fritze,** retired vice president and treasurer. Other appointments include **Frank A. Little** as director of purchases to succeed **W. C. Erkert,** re-

HERBERT B. LINK
. . . new president of Bellows



WALTON B. SOMMER
. . . Keystone vice president

ired; **Ford P. Schusler,** sales manager of the industrial division; and **William H. Getz,** sales manager of the merchant trade division.

George V. Luerssen, chief metallurgist, was appointed vice president in charge of metallurgy by **Carpenter Steel Co.,** Reading, Pa. He succeeds **B. H. DeLong,** who retires as vice president and technical director after 41 years' service. **Carl B. Post** becomes chief metallurgist, and **George E. Brumbach** was promoted to metallurgist, succeeding Mr. Post.

Frank E. Watts Jr. was appointed assistant metallurgist for **Hunt-Spiller Mfg. Corp.,** Boston.

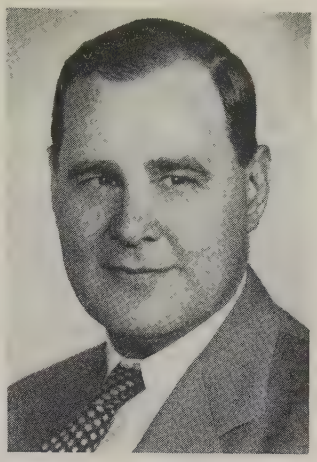
Carl A. Ten Hoopen Sr. was appointed assistant general sales manager, Cyclone Fence Division, **American Steel & Wire Co.,** subsidiary, U. S. Steel Corp. He will be located in general headquarters in N. Chicago. **Joseph F. Boyce** was appointed eastern district sales manager, Newark, N. J., for the division.

R. T. Eaton was appointed manager of sales, Pittsburgh district, **Bethlehem Steel Co.** He succeeds **C. H. Cecil,** resigned.

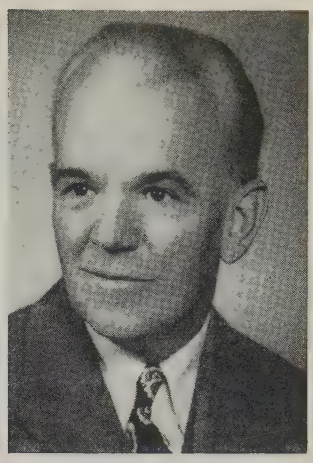
L. R. Gustin has been appointed superintendent of the bolt and nut plant of the **Bethlehem Pacific Coast Steel Corp.** in Los Angeles, succeeding **Robert Morgan** who has retired after 25 years with the firm.

John D. Gordon was appointed general sales manager of **Mechanical Handling Systems Inc.,** Detroit.

General manager of the **Ohlen-Bishop Manufacturing Co.** of Columbus, O., is now **E. W. Ristau.**



S. J. MORAN
. . . heads Blaw-Knox div.



P. M. FLEMING
. . . heads Blaw-Knox div.

Blaw-Knox Co., Pittsburgh, elected **P. M. Fleming** as president of Pittsburgh Rolls Division, and **S. J. Moran** as president of Union Steel Castings Division. During the past year Mr. Fleming has been manager of the division and now assumes the divisional presidency formerly held by **Q. S. Snyder,** retired. Mr. Moran during the past year served at Pittsburgh Rolls as general superintendent. As president of the division he succeeds **D. V. Sherlock,** retired.

John T. Edelen was appointed sales engineer in the Cincinnati office of the Machinery Div., **Dravo Corp.,** Neville Island, Pittsburgh. He is in charge of the Kentucky area.

P. E. Walters was appointed superintendent of production at **Westinghouse Electric Corp.'s** Motor Control Div. plant in Cheektowaga, N. Y.

L. Maynard Stauffer was appointed manager of General Electric Co.'s **Rocky Mountain Apparatus district.** Mr. Stauffer was formerly manager of the district's Salt Lake City office.

William V. O'Brien, a commercial vice president of **General Electric Co.,** Schenectady, N. Y., was appointed manager of the firm's Apparatus Marketing Div.

Robert Paxton was elected an executive vice president of **General Electric Co.,** succeeding **Hardage L. Andrews,** who retired.

William A. Sredenschek was appointed manager of materials and purchasing for **General Electric Co.** He will assume managerial duties formerly held by **Harry L. Erlicher,** who retired. **John A. Baldinger** was appointed General Manager of the **Automatic Transportation Co.,** Chicago division of Yale & Towne Mfg. Co.

Joseph W. Mueller was appointed assistant production manager for the **Kelvinator Div.,** Nash - Kelvinator Corp.

OBITUARIES...

Harold P. McCormick, Cleveland district manager, Reliance Division, **Eaton Mfg. Co.,** died June 19.

Charles F. Jenkins, 85, vice president, **Deemer Steel Casting Co.,** New Castle, Del., died July 2 in Philadelphia.

Webster C. Moore, 61, executive vice president, **Cordley & Hayes,** New York, died July 3.

Robert T. Brooks, retired executive vice president of **American Institute of Steel Construction,** New York, died July 2 in Minneapolis. Until retirement in 1946, Mr. Brooks had been connected with the steel fabricating and construction industry for more than 40 years.

Elmer R. Murphey, 72, founder and president of **James H. Rhodes & Co.,** Chicago, died July 4.

Leon A. Chaminade, 61, assistant chief engineer, **Chevrolet Motor Division,** General Motors Corp., Detroit, died June 27.

Alphonse F. Schulte, 51, superintendent at the **Production Steel Co.,** Detroit, before his retirement three years ago, died July 4.

Karl E. Lundquist, 65, founder and vice president of the **Lake City Foundry Co.,** Chicago, died July 3.

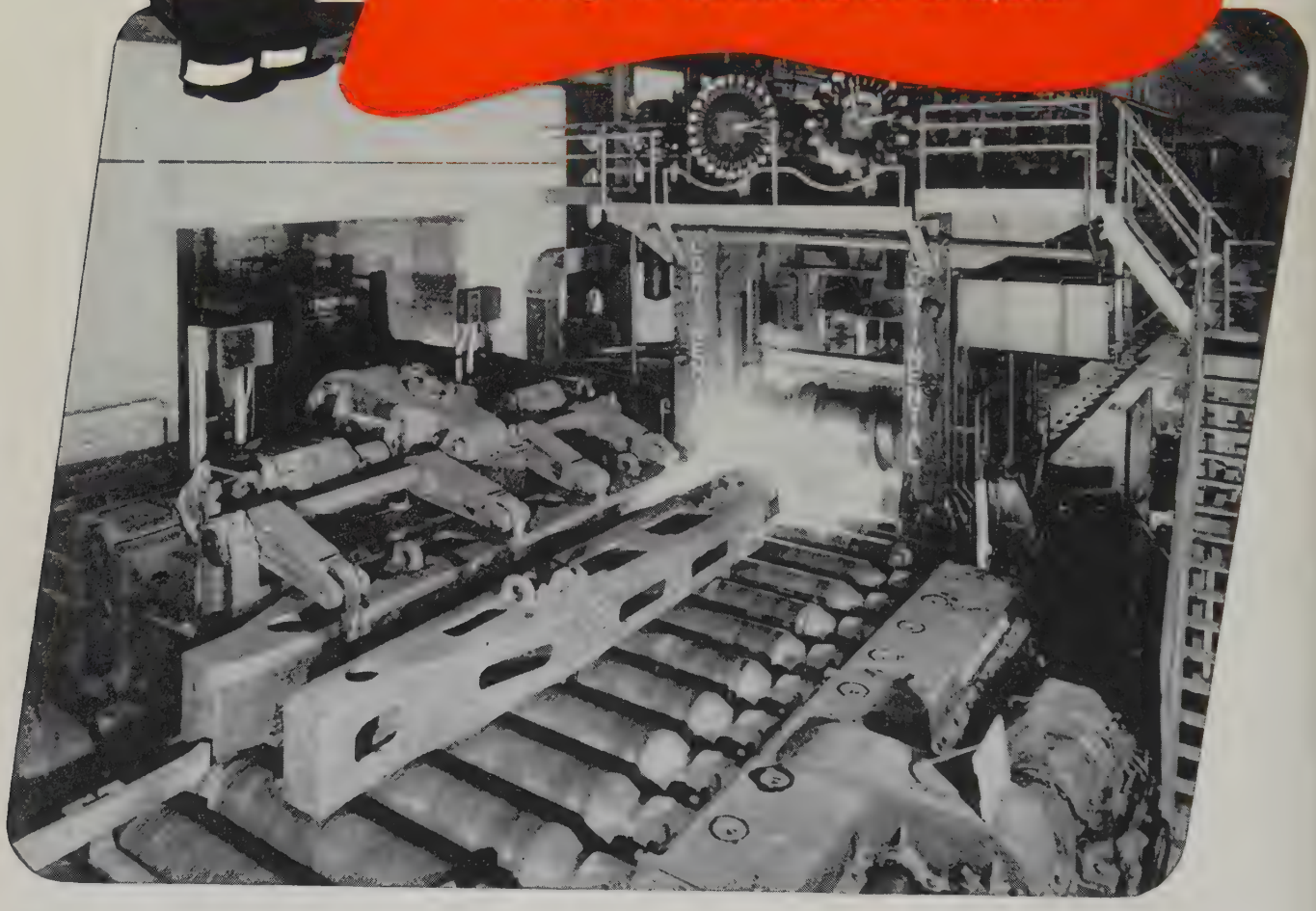
James G. Bryant Sr., 66, owner of the **Bryant Engineering Co.** of Port Huron, Mich., died July 5 at his summer home on Lake Huron.

Fred E. Holtz, 61, owner of **F. E. Holtz Inc.,** Milwaukee, died July 3.

James H. Harrison, 64, sales representative for **Ingersoll Products Co.,** Chicago, died July 2.

"Look What The Superintendent of a Leading Steel Company Says! We'll send you his name on request."

"The Trabon System on our old blooming mill gives us 50 more steel tons per week! We credit this increase and savings to the elimination of rejects."



Most of your machinery stoppages—due to bearing failures—could be avoided with Trabon. Shutdowns for lubrication are eliminated... Trabon lubricates as your machines produce!

Let us tell you about the features of Trabon oil and grease systems, and how they can save you thousands of dollars. Call or write today.

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Production and Engineering NEWS AT A GLANCE

PANEL-GLOW LIGHT—New light source, based on the principle of electroluminescence, employs thin flat sheets of conductive glass, coated with a phosphor dielectric plus a layer of vaporized aluminum, and connected at their edges to power wires, one to the glass and one to the metal backing. Brightness can be increased through use of a transformer, with a 4x6-foot panel on this basis consuming less energy than a 25-watt light bulb. Bright green is the only color now available; others including white are on the way.

HEAT LACQUER TO SAVE— Hot spraying of lacquer at Douglas Aircraft's El Segundo plant reportedly has cut 27½ hours from finishing time on AD-4 planes. One coat gives required film thickness, eliminating scuff sanding and the danger of exposing rivet heads and skin laps. Other favorable aspects of hot spraying (STEEL, March 12, p. 85) include reduced consumption of lacquer and thinner; better flow-out; reduced tendency to sag, blush or orange-peel, and a smoother, glossier appearance.

ALL-PURPOSE FLUID—Dilution of noncorrosive sulphurized cutting oils in automatic screw machines with oil from the machine lubricating or hydraulic systems may be overcome by the use of a single fluid for both cutting oil and machine oil. Dual or tripurpose active-type sulphurized oils have been developed specifically for such use in automatics where leakage is a problem. Precautions must be taken to add only new oil, not reclaimed, to the lubricant reservoir and hydraulic system.

SHAKE OUT SCRAP—Oscillating trough conveyors to handle loose bulk materials such as machine turnings, drillings, etc., are coming into wider use. A new automotive engine plant has installed them below floor level on all machines generating more than 40 pounds of chips in 8 hours. Essentially they are steel troughs of light-gage channel section supported by one-piece flexible members, with a small motor to provide the oscillating motion.

QUALITY CONTROL NO MYSTERY— Small plants fearing to dive into the intricacies of statistical quality control programs because of their presumed complexity and the lack of trained personnel to supervise the work may be impressed with the savings in cost of inspection and lowering of customer rejection rates which have been achieved by small operators who have instituted control efforts. —p. 74

PACKAGING KNOWLEDGE VITAL— Specifications for packaging metal parts for the military services' field requirements are spelled out in considerable detail, usually in the fine print of contracts. They may involve substantial expense, in the form of cleaning, rustproofing, preservatives, specially treated wrappings and boxing for shipment, which has been known in some cases to exceed the cost of the parts themselves. Prospective defense contractors are urged to take particular cognizance of these "tremendous trifles" when entering bids, to avoid having to "take the wrap" for a loss. —p. 70

FASTER ARC WELDING— Shielded-inert-gas-metal-arc (sigma) welding, a process now about three years old, has found successful application on aluminum, stainless steel, copper and copper alloys. Laboratory studies indicate interesting possibilities in the field of carbon steel. Sigma process characteristics include high current densities, consumable electrodes and argon or oxyargon atmosphere around the weld. —p. 75

CUT COBALT TO LIMIT— Progress has been made by the porcelain enamel industry in cutting cobalt requirements. Formerly 2.2 pounds of cobalt per ton of steel was the average; this has dropped to 1.3 pounds per ton. Further reduction is claimed impossible without raising serious manufacturing difficulties.

FLUID RHEOSTATS— Motors, two of them exceeding 65,000-hp rating, for powering a new wind tunnel at the Arnold engineering development center at Tullahoma, Tenn., will be controlled by liquid rheostats under construction at a Buffalo Westinghouse plant. Each rheostat is more than 20 feet high, comprising three 9-foot tanks in which an alkaline solution is circulated. At the base of each tank is a stationary nickel-clad steel plate. A similar electrode is attached to a movable plunger-like support at the top, current passing from one electrode to the other through the solution, the closer the electrodes the more current flows.

MAGNETIC RAM DOES IT— In assembling a steel cup to a zinc die cast protector cap for Navy rockets, the shallow cup is press fitted into the top of the casting, with a sealing compound applied on the edges. To position the cup accurately, permanent magnets are set into the ram of the press and hold the steel part firmly as it is driven home.

STILL DICKER ON THREADS— Encouraging progress is being made on Unified Screw Thread Standards, although there are differences yet to be resolved between American and British aeronautical practices in sizes below ¼-inch to achieve interchangeability of screws used to attach small components such as instruments to a major assembly. The subject was explored recently at a London conference of A-B-C representatives. —A.H.A.

Metalworking Outlook—p. 33 *Market Outlook—p. 133*

Protruding edges of jeep clutch assembly previously dipped in preservative oil are covered with protective tape to prevent puncturing the final package

Dessicant made fast to clutch absorbs moisture trapped in final package. An indicator is added to show its effectiveness. Polyethylene coated kraft paper prevents oil seepage

Watch Packaging Specs in Figuring

Costs of processing and protecting metal parts for overseas shipment or long-term storage may be higher than value of piece manufactured. Your company can take a substantial loss if insufficient attention is paid these requirements

MILITARY contracts may look like pots of gold at the end of the rainbow especially if you can't get enough metal to sustain normal civilian production. The average metalworking company probably will have to devote at least part of its capacity to military or defense work in the coming months to keep its plant operating near capacity.

But there is a joker in the deck for the company that fails to look over carefully invitations to bid. Military packaging requirements may turn a contract bid into a substantial loss, particularly for a small firm inexperienced in such dealings.

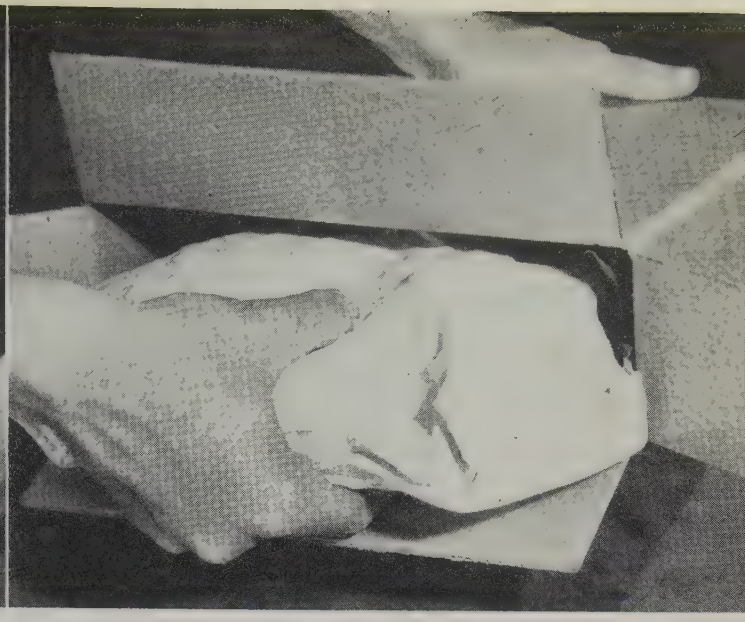
Take a Good Look—Your company may be experienced in making parts similar to those called for in a military contract—but take a good look at the packing and packaging specifications before entering a bid. Here's how an Ohio aircraft parts manufacturer took a sizable loss: A quick look at the invitation to bid revealed that domestic packing was called for and so a low bid allowing for a moderate profit was entered. Close scrutiny would have given vital information as to the prescribed packaging method and boosted the bid considerably. In its eagerness to get a contract representing a large volume of work, this company overlooked the processing and packaging requirements that added substantially to the total cost.

Manufacturing cost of steel dowel pin used in the barrel and receiver assembly of an M1 service rifle is 3.5 cents. It costs 17 cents to treat this pin with preservative and enclose it in an aluminum foil lined paper envelope. The packaging requirement is tough because the pin must fit perfectly when issued as a spare part in the field even after lengthy storage. Not all military spare parts cost four or five times as much to package as to manufacture but the above example is duplicated on a variety of parts.

Losses Whittled Down—In 1942 only 45 per cent of materiel arriving overseas was in usable condition; by 1945 this figure climbed to 75 per cent and the Defense Department hopes to raise this total to 95 per cent soon. These figures clearly indicate that the thinking of military and industrial packaging experts is directed in the right channels. From the standpoint of cost, time and military considerations, we can't afford to duplicate the 1942 shipments' losses.

Experiments are continually in progress at the packaging development branch of the Engineer Research and Development Laboratories, Ft. Belvoir, Va., to prevent materiel from being damaged in shipment because of faulty containers and to stop internal damage by corrosion, fungi or because of improper processing before shipment. In addition the Naval Research Laboratory and the Air Materiel Command have a number of projects with the same general

Moisture vaporproof laminated foil envelope serves as final protective wrap. Jaw-type heat sealers are used to close the open end and make long-term storage possible



Clutch is placed in carton prior to insertion in wooden shipping case. Cushioning material fills out the pack. Photos courtesy Dobeckmun Co.

ilitary Contracts

By ED KARPICK
Associate Editor

MILES of hiking down Pentagon corridors and conferences with military and industrial packaging experts pointed up this problem facing contractors working on military jobs

aims. After a container or a packaging technique is "put on the rack" in the laboratory further tests are conducted in the field since that is where the final stamp of approval must be applied.

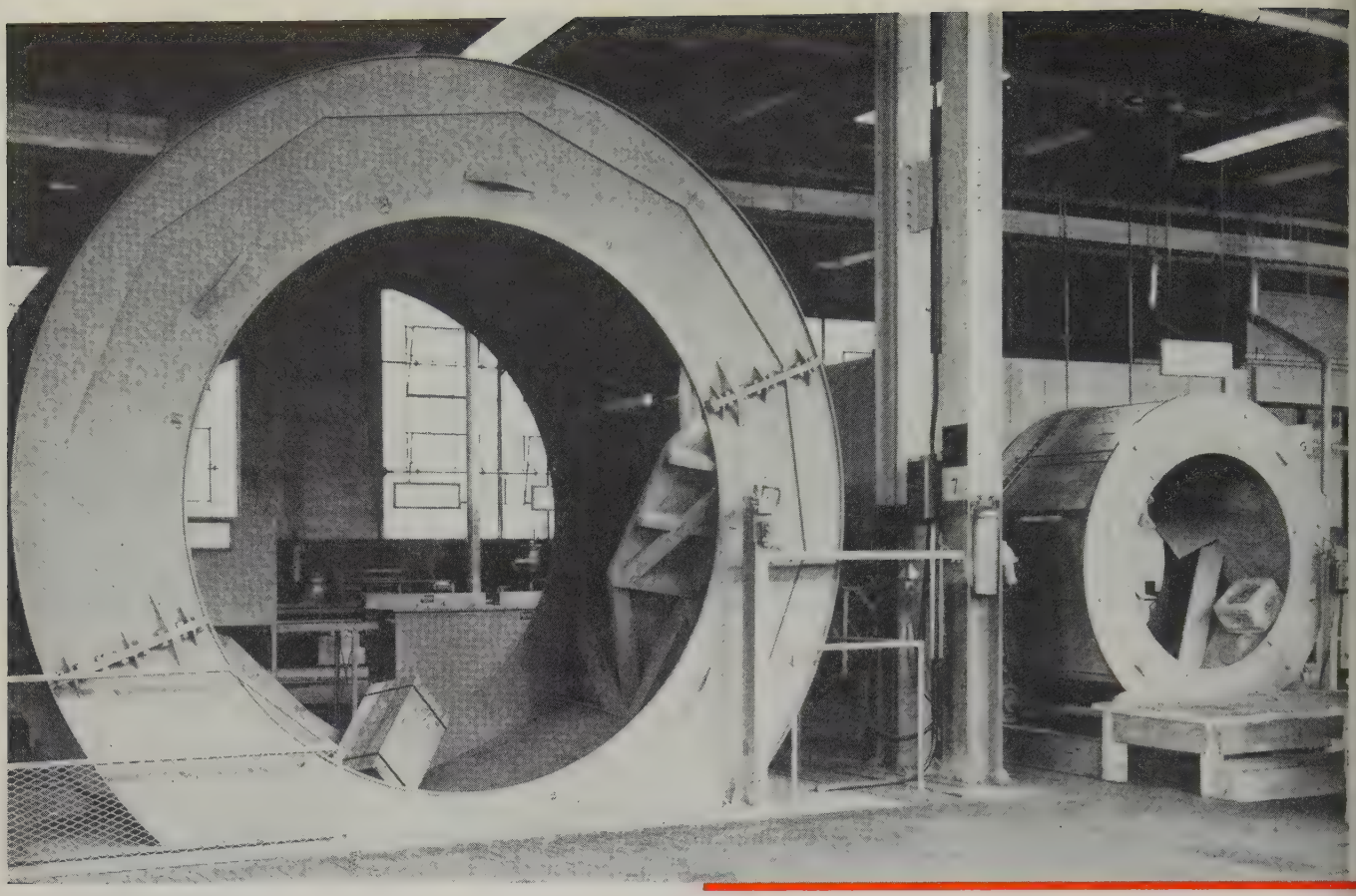
Only the Rugged Survive — At Ft. Belvoir containers are given vibration tests, a revolving hexagonal drum test to determine ability of the container to withstand rough handling, an incline-impact test, external compressive load tests and submersion in a water tank. Facilities of two climatic laboratories permit running tests to duplicate either tropical or arctic conditions; temperatures can be raised from minus 65 to 196° F in 6 hours. Accelerated weathering machines aid on-the-spot investigations.

A processing line for duplicating many steps performed in industry includes: Facilities for rust removal by means of heated acid bath; cleaning by steam, emulsifiable solvents, alkaline bath or by petroleum solvent bath; infrared oven drier; fingerprint neutralizer; ethyl-cellulose and acetate butyrate strip coating tanks; preservative compound tanks; tanks for dip-coat sealing; and complete facilities for wrapping, packing and packaging.

This facility makes important contributions in determining exactly the kind of processing that will be applied to parts after manufacture, kinds of wrapping used and the shipping cartons required. Through these tests new container designs are evolved not only to make crates and cartons stronger but lighter. Overpackaging is not a rare occurrence and in several instances the weight of crates tested exceeded that of the equipment. With present plans calling for an increasing volume of military materiel to be transported overseas and supplied to combat troops in the field via air, savings in container weight that can be made without sacrificing strength are of great importance.

Learning the Right Method—All this research and development is of no avail if there aren't enough trained personnel around to make use of the materials available. A packaging school is being conducted at the Rossford Ordnance Depot in Toledo, O., to train military and civilian packagers. Industry trainees are limited by the facilities available and are invited from firms that have military contracts. About eight industrial trainees can be handled per two-week course at the present time but the facility is being enlarged to accommodate more. Still in the discussion stage is a plan to set up additional schools in other geographical areas.

If you are shopping around for military contracts, you may want to arm yourself with these volumes: Indexes of Specifications and Standards used by the Munitions Board Standards Agency, Department of



Hexagonal drum test is only one form of torture to which shipping containers are subjected at the Ft. Belvoir packaging laboratory

the Army, Department of the Navy and Department of the Air Force (Military Index Vols. I, II, III and IV). The first two volumes may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington for $2.75 each. The Navy index may be obtained without charge from the Navy Purchasing Office, Bureau of Supplies and Accounts, Navy Department, Washington. The Air Force, too, makes no charge for its publication which is available from the Commanding General, Wright-Patterson Air Force Base, Dayton, O.

Listed in these volumes are the hundreds of specifications pertaining to items procured by the respective departments and the agency within the department that is custodian for the detailed specification. Examples of custodian agencies are: Ordnance, Engineers and Quartermaster Corps in the Army and Bureau of Ships, Ordnance or Aeronautics in the Navy.

If your company bids on a subcontract for supplying parts to be used by a prime contractor in assembling a major military item then you'll have few packaging problems. In most instances the shipment has to be made in accordance with accepted commercial practices. This may also be true on some parts going to Ordnance or other military storage depots where the parts will be treated and packaged by personnel attached to these activities.

Watch Your Step—Contracts for spare parts and a variety of other items aren't as easy to handle. First, of course, you have to determine a unit price for making the item, then figure how much to add to your bid for packaging and packing in order to be able to handle the job at a profit. The latter is tougher for most companies. Manufacturing operations are not much different in the majority of contracts from those performed on civilian products but packaging requirements can be and often are vastly different.

Extensive use is made of barrier materials and preservative compounds in packaging metal parts. Volatile corrosion inhibitors combined with barrier materials promise to be of great importance but cannot be used except on certain Air Force contracts at present.

Tools of the Trade—Method I packaging of gears, pins, shafts and similar metal parts generally calls for using a two-solvent cleaning method including a fingerprint neutralizer and application of preservative compound, either quick drying or nonsolidifying types. The part is then wrapped in a grade A greaseproof polyethylene coated paper or barrier material. Sharp or protruding edges are covered by two thicknesses of grade C type I cushioning. This material is essentially cellulose acetate film coated and combined to scrim cloth with a heavy coating of microcrystalline wax. If the contract does not specify the exact number of pieces to be placed in a carton, the general rule of not more than 50 pieces, weighing not more than 25 pounds (whichever is the smaller) applies. Parts packaged for overseas shipment fur-

er require an overlap with grade C type I material d sealing with a hot wax dip.

Materials such as electric motors, electronic equipent, bearings, etc. that would be damaged by oils greases get a method II pack. These items are rapped in a heat sealing barrier material consisting a vinyl film laminated to an aluminum foil which in turn laminated to polyethylene film and then scrim cloth. Silica gel crystals are added to keep midity level in the package below the point conicive to corrosive action.

New and Promising—Rust preventives covered by ecification MIL-P-3420, Packaging Materials, Volile Corrosion Inhibitor Treated, have only limited rvice acceptance, primarily for Air Force use. An ticle appearing in *Ordnance,* September-October isue, gives the background leading to the development this family of inhibitors and results of tests made dicyclohexylamine nitrite patented by Shell Delopment Corp. and designated VPI (vapor phase hibitor). Although both laboratory and field tests ake this packaging method a "hot" item, it cannot e used in filling Ordnance or Navy contracts.

Lower packaging costs, easier and cheaper cleaning d long-term protection are some of the advantages cruing from using volatile corrosion inhibitors. Ofcers and men who have cleaned weapons coated with eavy "gunk" in the field form a cheering section for this preservation method but some military channels feel further testing is necessary before full approval is granted.

There are several companies manufacturing products that fall into this general classification. Most of the military experience has been with VPI since the other firms' products have not completed the required year of field tests. Laboratory experiments indicate that the other products will do the job required. So far inhibitors in this family group are recommended only for ferrous metal preservation until such time as the effects on nonferrous metals can be further appraised. Commercial uses of this protective method are growing rapidly.

Many metalworking companies are faced with the problem of deciding what to do about their packaging and packing after they have read the applicable specifications. Smaller concerns often do not have the facilities to handle this work and even larger plants sometimes do not have a sufficient volume on a particular military order to economically justify setting up a packaging line for this work.

Give It to an Expert—One solution is to farm out this work to packaging specialists. There are a number of packaging plants in all metalworking centers that will handle these jobs on a subcontract basis. The contracting firm must ascertain that the packagers are capable of doing the job right because it can assign rights under the contract but not responsibilities. Not every organization that hangs out a sign is capable of meeting contractual obligations.

Fortunately most packaging firms are reliable small business concerns, and are as zealous in maintaining their work standards as are the manufacturers. An additional safeguard in selecting a packaging specialist can be used by checking with a district Ordnance or Navy inspection office. The government packaging specialists maintain lists of approved installations and will refer interested manufacturers to these approved concerns upon request. Whenever new packaging concerns are organized they are added to Ordnance lists after a thorough inspection of their facilities.

The packaging firms often assist metalworking companies in preparing their bids on an item by placing a specific price for processing, packaging and packing said article and enabling the contractor to enter a reasonable bid. Even these specialists branch out in definite lines like electronic instruments or large machinery. By confining their operations to fewer items, these companies can hold down costs and assure their customers of a job that will pass inspection without difficulty.

Here are a few precautions to observe before bidding on a military order: Examine the packaging requirements carefully to see how much they will hike costs; don't be blinded by the size of the contract. Get familiar and keep current with the packing and packaging requirements that apply to items within the scope of your plant's manufacturing processes. Make a cost study to determine whether it is cheaper to do the job yourself or have it done by a packaging specialty firm. Check with your military contracting officer before subcontracting your packaging to a firm you know nothing about.

At the left an M1 service rifle is protected by "gunk" as is the current practice. Volatile corrosion inhibitor still undergoing study by the military and a laminated foil envelope did the job on weapon at the right

QUALITY CONTROL . . .

It Works in Small Plants, Too

By JOHN S. MORGAN
Associate Editor

"STATISTICAL quality control? High brow stuff . . . all right for the big boys who can afford to hire experts to put it into practice, but we're too small to be able to use it."

That's the typical reaction to quality control from many smaller metalworking companies who know nothing about it or who know a little but have heard of cases where its use has backfired. What's the real story? Can a statistical control system on quality be used economically and effectively in a small company?

Yes, Again Yes—"Yes," says Wade R. Weaver, Republic Steel Corp.'s director of quality control and president of the American Society for Quality Control. "Yes," says Lundberg Screw Products Co., a Lansing, Mich., firm which has a successful statistical control program now operating although it employs only 165 production workers.

"Two factors," says Mr. Weaver, "make many companies shy away from quality control: Lack of understanding of the system's principles and the circumstance that many of the users of quality control who have turned sour on it have been small firms." That latter factor results because smaller companies have been prone to adopt quality control with an inadequately trained man supervising the job, not because statisical controls don't apply to the little fellow. "Actually," Mr. Weaver points out, "it is more readily adaptable to the small company because the statistics are less complex, the operations simpler than in a large firm. The little company should have a trained man to supervise the job, but he need not have the education and experience required of a man supervising a big company's system."

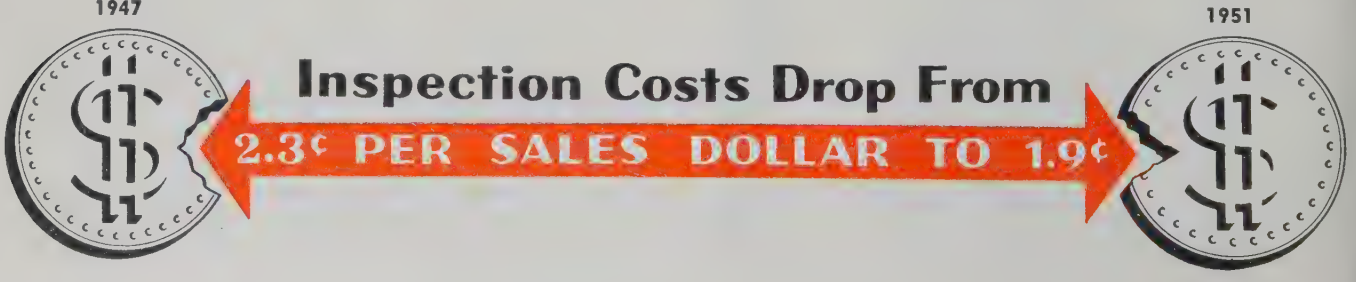
Iowa Start—Lundberg's quality control system had its start when the company president and general manager, H. B. Lundberg, first saw it used five years ago in John Deere Co.'s Waterloo, Iowa, plant. "It looked simple," he recalls, "and we immediately took steps to adopt a system like Deere's." Deere had a few machines working on its own parts in continuous operations. The exact Deere system did not work out too well at first in a screw machine product job shop like Lundberg's, but the company experimented, adapted, revised and expanded in an evolution that's still going on.

Lundberg's system was put in charge of Chief Inspector Robert D. Muir. He uses various forms of the control system in about a third of his company's manufacturing operations. A fraction defective type of program is used in the automatic screw machine departments. It is just being inaugurated and is based on a batch-type of control using Lundberg's own sampling acceptance tables. Fraction defective charts are maintained on each automatic machine. That same type of control is also used in the heat treat department. Lundberg expects eventually to extend that type of statistical sampling into all second-operation departments. The company also uses Average-Range charts, Lot-Plot charts and Machine Capability studies throughout the plant on selected problems. Inspectors sample every lot before shipment, using a double sampling procedure. Lot-Plot charts are also used in final inspection acceptance of certain critical items.

The Proof of the Pudding—How has a smaller company such as Lundberg made out with quality control in the five years it has been using it? In the spring of 1947, its production and scheduled working hours were comparable to the performance this year. A March-April check in both years (see pictogram) shows that inspection costs have dropped 0.4 cent per sales dollar in four years. That decrease comes in spite of adding a gage section, an inspection group leader and a skeleton final inspection group on the night shift.

Inspection costs are down, yes, but how about that essential customer rejection rate? A company analysis shows that in the same 1947 and 1951 periods, Lundberg's rejection ratio dropped from 3.8 per cent to 1.1 per cent. That lower figure is further minimized by the fact that the customer today is much more rigid in enforcement of his specified quality requirements than four years ago.

Patience—Any company—big or little—must expect a long period of evolution in working out a successful control program, Lundberg believes. But the system can be set up with a minimum expense that will soon be amortized as the preceding inspection costs have revealed. But at (*Please turn to Page* 90)



Sigma Welding Applications Expand

The shielded inert gas metal arc process using consumable electrodes is currently being applied commercially to aluminum, stainless, copper and copper alloys and even to carbon steel. Small amounts of oxygen added to highly purified argon increase welding speed on steel

By H. E. ROCKEFELLER
Assistant Manager
Development and Process Service
Linde Air Products Co.,
New York

This small nonwater-cooled torch was developed for welding light materials. Current capacity about 75 amp

INERT gas shielded arc welding, which includes the use of a consumable as well as a nonconsumable electrode, has, in slightly over a decade, become one of the major fusion welding methods. For the nonferrous and "difficult to weld" metals, it is rapidly becoming a preferred fusion welding method. It has not only largely replaced other methods, but has permitted fabrications hitherto impracticable for welding.

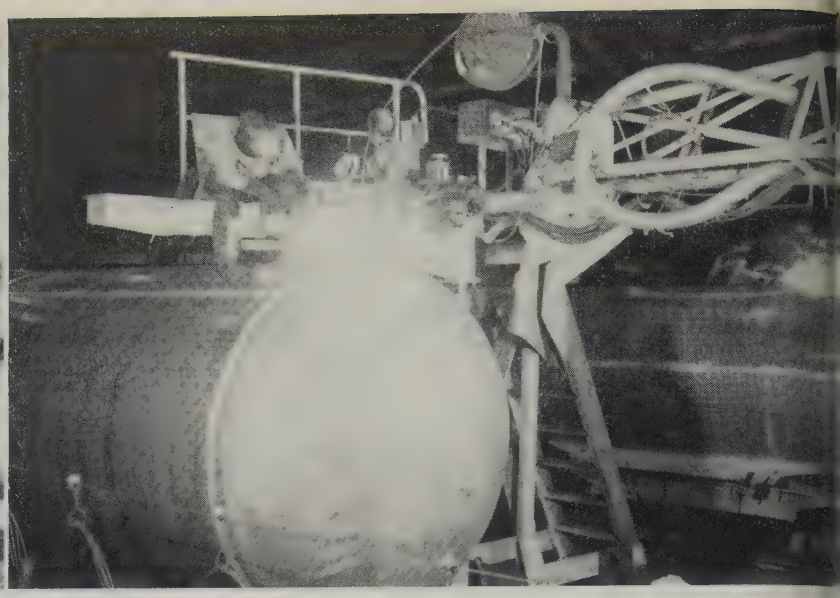
The nonconsumable electrode type of inert gas shielded arc welding, named "Heliarc," was first commercially established in California in 1940 by the Northrop Aircraft Inc. for their own application in the welding of magnesium for aircraft fabrication. Recognizing the possibilities of this process, Linde, in 1942, acquired the Northrop invention, and initiated an extensive research and development program to expand use of the process. In the initial investigations, it was established that argon offered several advantages over helium as a shielding gas. Argon being approximately ten times as heavy as helium gave more complete protection at a considerably lower gas flow.

First Application, Aluminum — Aluminum offered one of the broadest fields of application and much of the early research and development effort was devoted to establishing suitable Heliarc welding conditions for the metal. With the direct current welding used by Northrop in welding magnesium, satisfactory results could not be obtained with straight polarity and electrode heating with reverse polarity materially reduced the welding speed obtainable. A good cleaning action was obtained in reverse polarity welding which effectively removed the aluminum oxide when using argon.

Through the use of alternating current welding, a satisfactory compromise was established in that the reverse polarity cycle provided the cleaning action and the straight polarity cycle improved the heat input to the weld with consequent material increase in welding speed and higher current-carrying capacity for the electrode. By superimposing a high frequency current on the welding current the arc could be established without touching the metal. This eliminated contamination of the electrode and also stabilized the arc during the welding operation.

In the Heliarc welding of all other metals except

First water-cooled torch using a water-cooled cable and ceramic cup. Maximum capacity 300 amp



Sigma welding aluminum tank cars, with equipment of the fully automatic type

magnesium and aluminum bronze, on which alternating current is also preferred for most applications, direct current straight polarity generally provides the most satisfactory and efficient power source.

Enter Sigma Welding—In 1948 the "shielded-inert-gas-metal-arc" process was introduced by the Air Reduction Co. This process employs a consumable electrode. The electrode is continuously fed from a rod reel similar in principle to submerged melt welding except that the inert gas replaces the granular welding composition.

The shielded inert gas metal arc process, called "sigma welding" from the initial letters of the five words, was applied first to aluminum. Subsequently it has been commercially used on stainless steel, copper and copper alloys including silicon and aluminum bronzes, and even on carbon steel. The process is less than three years old and can still be said to be suffering somewhat from growing pains. Largest commercial use at present is in the flat position welding of aluminum. On this application, and with argon as the shielding gas, quality comparable to that obtained with the Heliarc process is readily secured, particularly with fully automatic equipment. On stainless, copper and copper alloys, argon gives excellent weld quality and deposition control. With argon, a more stable arc can be maintained with a lower gas flow and much less spatter. Considerably higher rates of metal deposition can be made in sigma welding.

Distinguishing Characteristics — Several characteristics in inert gas shielded arc welding distinguish this process from other fusion welding methods. Furthermore, certain fundamental differences exist between the nonconsumable electrode (Heliarc) method and the consumable electrode (sigma) method.

Probably the most important characteristic common to both techniques is the elimination of flux and resulting slag. Fluxes required by other processes for welding aluminum, magnesium and some other metals contain constituents which are corrosive to the base metal if not removed after welding. Their removal from the weld surface adds cost to the overall fabrication. Such removal is often difficult and for certain joint designs, impracticable.

Another important difference in inert gas shielded arc welding is the characteristic higher current density employed. In Heliarc welding average current density recommended is about ten times that for carbon arc welding, and about three times that for coated metal arc welding. In sigma welding the current densities employed average at least twice those used for Heliarc. This permits use of an exceedingly high heat concentration with a consequent ability to secure deep penetration, narrow welds, a smaller heat-affected zone, and reduced distortion.

No Filler Wire—In Heliarc welding, use of a nonconsumable electrode permits joining of metals without the addition of filler wire at generally lower costs and with less distortion than with oxyacetylene, atomic hydrogen or carbon arc welding. Where filler wire is required the placement of the weld metal in butt welding can be more accurately controlled than in the coated electrode or sigma welding, and finishing costs may be reduced when smooth finishes are required. This characteristic of separate control of heat input and addition of filler metal also permits better control of the elimination of gases which may be evolved from the base metal during the welding operation.

In sigma welding, on the other hand, a better heat transfer efficiency is obtained because the added metal is carried over in the molten state in the arc stream rather than heated from the nonconsumable electrode or molten puddle. Current densities are not limited by the melting temperature of the tungsten electrode. These characteristics result in higher rates of metal deposition, lower costs and higher weld zone cooling rates. Quality of the deposited metal is more difficult to control because of the critical nature of the manner of metal transfer.

For best welding conditions, metal transfer con-

sists of a series of discrete metal droplets propelled at a high velocity. This droplet formation varies for different metals and for different current densities. Commercial growth of sigma welding may well be determined by the extent to which the droplet formation can be controlled.

Oxygen Speeds Process—The droplet rate, particularly on stainless and carbon steels, can be materially increased by the addition of small percentages of oxygen to a highly purified argon. Droplet rate in this oxyargon mixture has been as much as 50 times greater than in an atmosphere of pure argon, other conditions being the same. This greatly increased droplet rate, with no change in current density, permits welding at higher speeds without undercutting. Coalescence of the weld metal is improved at increased welding speeds. Overhead welding of stainless steel is made practicable.

On the other hand, the oxyargon mixture permits welding at lower current densities. This means that larger diameter, more economical rods may be used for a given welding current. If the same size rod now available is used, then thinner materials can be welded.

Welding Aluminum—The most extensive use of the inert gas shielded process to date has been on aluminum and its alloys. Prior to the introduction of Heliarc welding, oxyacetylene or oxyhydrogen welding was employed for most sheet metal and light plate fabricated by butt welding. Carbon arc was in use for mechanical welding of the heavier plate material, and metallic coated electrode welding for structural joining and some butt welding.

Sigma welding has replaced Heliarc on certain of the butt welding applications and metallic arc on certain structural weldments. These two variations of shielded inert arc welding have also encouraged the fabrication of aluminum on applications for which no other method would have provided either the required quality or economy.

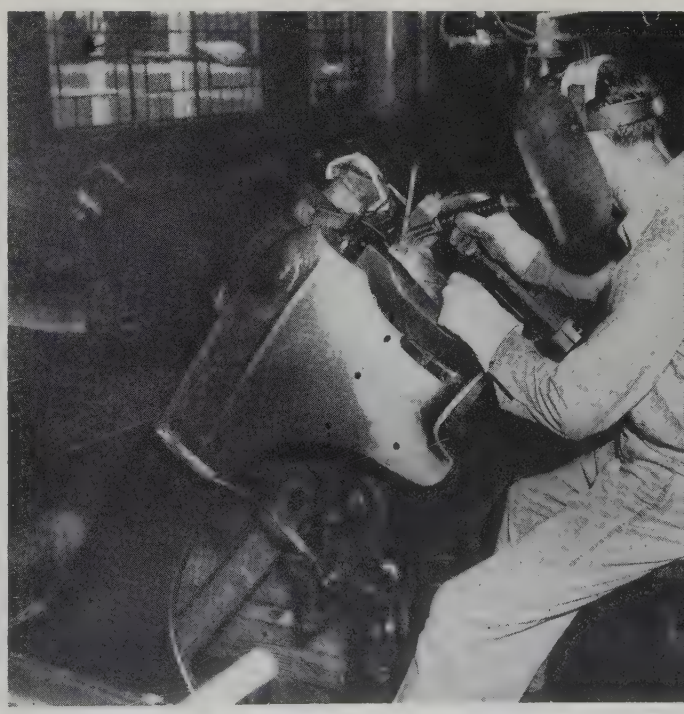
History of welded fabrication of aluminum tank cars furnishes a good example of the advances in aluminum welding. The first tank cars were fabricated by oxyacetylene welding. This process was later replaced by mechanized carbon arc welding, which then gave way to Heliarc welding. Within the past two years, Heliarc welding, in turn, has been replaced largely by sigma welding.

Costs Down—While overall cost comparisons must include a number of factors other than direct welding costs, the comparisons given in the accompanying table are significant in illustrating the possible savings of sigma welding in the fabrication of relatively heavy aluminum plate by butt welding.

Reasons for replacement of Heliarc with sigma welding are largely dictated by cost. However, for fillet welding, the sigma process has the added advantage of improved penetration. Quality, on the other hand, still remains the dominant factor on some applications. In sigma welding the problem of controlling porosity has not been completely solved but equipment and process developments are providing suitable answers on selected applications. When this is accomplished sigma welding will undoubtedly become the most economical fusion welding method on all applications of aluminum where the addition of filler metal is a requisite.

Welding Stainless—In the stainless steel field, Heliarc welding has largely replaced oxyacetylene and metal electrode welding on light gage material. This is primarily due to lower distortion compared to gas welding, and to lower finishing cost compared to metal electrode welding. Heliarc welding offers a quality advantage over other processes in that there is no loss of stabilizing or other elements and no carbon pickup. Additionally, this process provides a latitude in welding certain compositions which have not been satisfactorily welded by other processes. The process may be more costly than metal electrode welding in applications on materials over ⅛-inch thick where other factors do not compensate for the deposited weld metal cost.

Welding Copper and Copper Alloys—Copper and copper alloy welding seems to be following the same general sequence in preferred welding method that has occurred in the case of aluminum. Satisfactory welding procedures have been developed both for Heliarc and sigma welding and the advantages are relatively the same. Because of the high heat conductivity common to copper and copper alloys, the rapid heat input rate associated with the sigma process shows particular advantage over the Heliarc process in the heavier gages. With the sigma process very satisfactory welds have been made in the thicknesses up to ½-inch without preheat. A particularly interesting application is the repair of a massive 7000-pound cast copper mold. As frequently happens in preparing such molds, a defect was uncovered in machining. This was repaired by sigma welding using a hand torch with a preheat of 500°F. A welding



Heliarc process being used in the welding of automobile fenders

current of 400 amp effected a very satisfactory repair.

Welding Carbon Steels — The welding of carbon steels has, of course, dominated the application of fusion welding. Statistics show that over 95 per cent of all fusion welding is applied on carbon steels. In the Heliarc field considerable application has already been made for certain sheet metal weldments. In the automotive industry particularly, the process is applied to welding fenders, body joints, bumper guards, bumpers and other accessory parts requiring metal finishing. The process has found acceptance in this field because the welds could be produced at high speeds with no porosity, slag or spatter, a minimum of reinforcement, controlled distortion, and low costs.

Tungsten arc semiautomatic rod feed and automatic welding devices will increase the use of the process materially. Speeds of 80 to 100 inches per minute on 20-gage material appear to be entirely practical. Competition is extremely keen in this field, and because of cost, Heliarc welding will probably be limited to applications where finishing or some other factor favors this process in the overall cost consideration.

Field for sigma welding carbon steel is as yet unknown, but sufficient laboratory work has been carried out to establish that sound welds can be produced, and at speeds that should provoke considerable commercial interest.

COST COMPARISON
HELIARC VS. SIGMA WELDING

Costs for 100 Ft. of ½-In. Aluminum Plate

	Heliarc	Sigma
Welding Rate, in. per min. per pass	10	12
No. of Passes	3	2
Duty Factor, %	40	70
Argon Used, cu. ft.	1125	335
Rod Used, lb.	14	6
Labor at $2.00 per hour	$ 30.00	$11.40
Gas Cost	112.50	33.50
Rod Cost	10.40	4.68
Power and Miscellaneous	1.00	.75
TOTAL	$153.90	$50.33

From data presented by the author at the 1951 Western Metal Congress, Oakland, Calif.

Automatic Stopping Devices Speed Fatigue Tests

SEVERAL devices recently constructed at the National Bureau of Standards are proving valuable in speeding mental fatigue tests. Auxiliary test equipment includes devices for stopping the testing machine when a small crack forms in a specimen, apparatus for the uniform polishing of fatigue test specimens, and a machine for fatigue-testing thin sheet specimens in bending.

Stopping the Test Machine—One commonly used fatigue-testing machine applies a bending moment to the specimen, simultaneously rotating it so that every point on its surface is subjected to a cycle which goes from tension to compression during each revolution. Mounted on standard commercial testing machines, the two NBS stopping devices respond to changes in the specimen stiffness when a small crack forms.

In a typical machine the specimen of 0.25-inch minimum diameter is drawn into spindles in bearing boxes, supported at the ends away from the specimen and loaded at the ends near the specimen by weights hung on shackles. This loading results in a deflection of the bearing boxes, and the deflection increases when a crack forms in the specimen. If the crack is only on one side of the specimen, the deflection will vary periodically with each revolution of the specimen; in other words, the bearing box will vibrate. Both the deflection and vibration are used to actuate stopping devices; one device is deflection-responsive and the other is vibration-responsive.

The NBS deflection-responsive stopping device consists of a microswitch operated by a lever. The lever is fastened rigidly to one of the bearing boxes, and at the other end carries an adjusting screw which bears on the actuating leaf of the microswitch. After the machine has run long enough to reach the temperature equilibrium, the adjusting screw is advanced until a minute change in the position of the lever will trip the microswitch and shut off the machine.

Ball on Pedestal—The vibration-responsive stopping device, which is fastened rigidly to one of the bearing boxes, consists of a steel ball poised on a three-pronged pedestal. Vibration resulting from an incipient crack in one side of the specimen shakes the ball from its perch; in falling, the ball closes an electrical circuit that shuts off the machine. Sensitivity of the device may be adjusted by varying the distances of the pedestal prongs from each other.

Apparatus for Polishing—Surface condition of test specimens has an important effect on fatigue and must therefore be made as uniform as possible. Two pieces of apparatus developed at NBS, both entirely automatic, make possible close duplication of the polishing operation from one specimen to the next.

Two types of specimens, smooth and notched, are used in NBS fatigue tests. The machine for finishing smooth specimens consists essentially of three parts—a wheel carrying an abrasive belt, a means for supporting and rotating the specimen during the polishing operation, and a means for moving the specimen across the abrasive belt during polishing.

The wheel is distinctive in consisting of a large number of metal spring leaves, radiating outward from a hub, which press against the abrasive belt. This arrangement conforms the abrasive belt to the contour of the specimen and assures uniform pressure.

The apparatus for finishing notched (filleted or grooved) specimens is new only in a few details. It consists essentially of an abrasive-charged wire which rotates against the bottom of the notch while the specimen is slowly rotated.

Testing Thin Sheet—Because of the large deflection required, sheet metal of less than about 0.015-inch thickness cannot be fatigue-tested in bending on commercially available testing machines of the cantilever type. By deflecting the specimen as a column, a newly-developed NBS fatigue-testing machine makes possible the bending of specimens to a small radius of curvature without large amplitudes in the drive mechanism.

Increase

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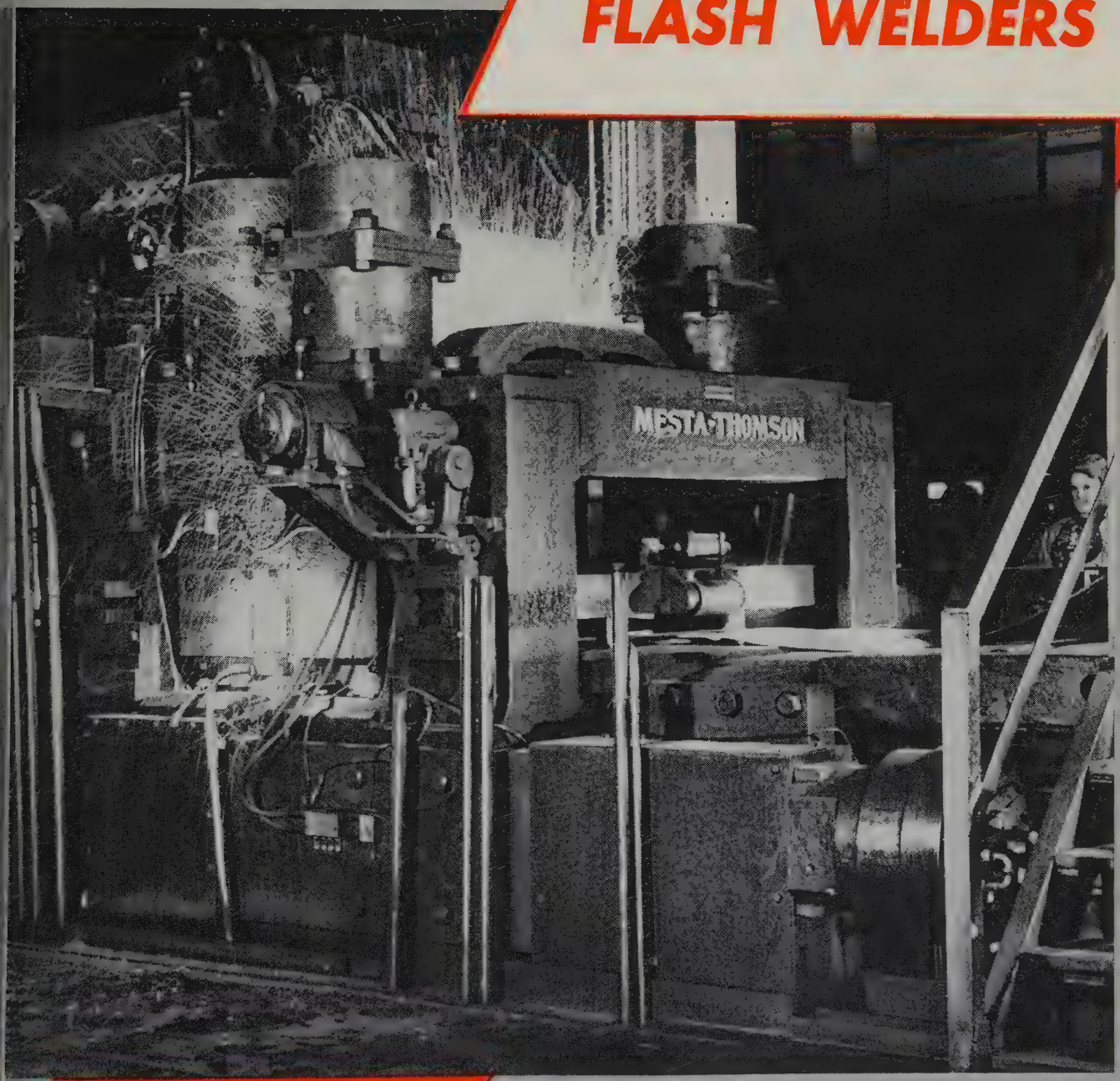

Mesta-Thomson Flash Welder installed in a Mesta High-Speed Continuous Pickling Line

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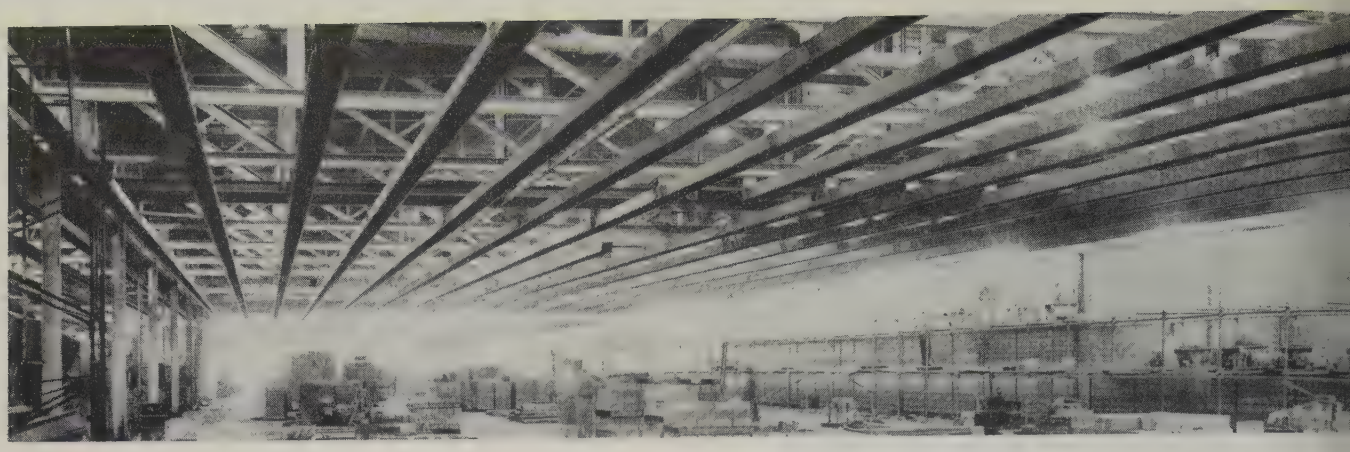
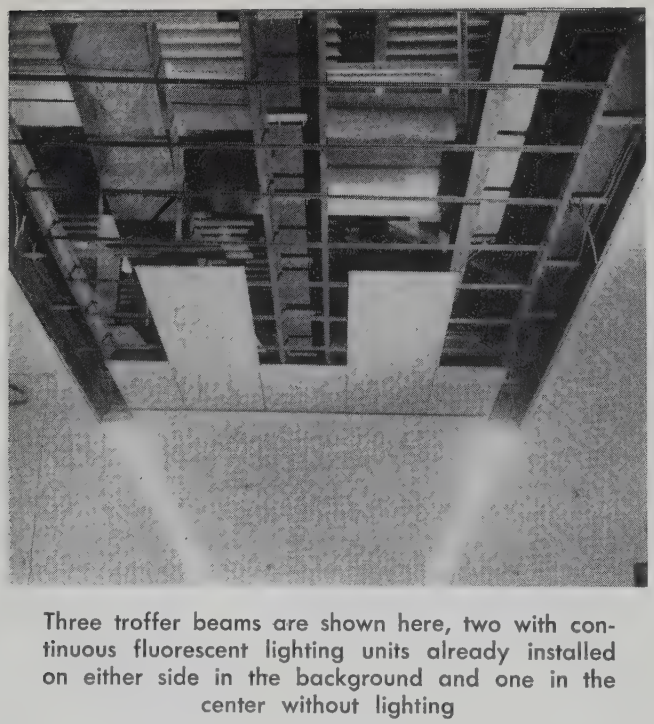


Troffer beams form the structual core of the integrated ceiling-lighting system. Beams accommodate wiring and lighting fixtures and provide structural support for suspended ceilings and for duct work, piping and other facilities above the ceiling

"Troffer Beams" Support Integrated Ceiling-Lighting System

AN INTEGRATED ceiling-lighting system type of construction developed by Austin Co., Cleveland, and introduced at a new midwestern plant provides a simple means of installing fluorescent lighting systems in industrial plants, offices and other buildings —particularly where preformed acoustical ceilings are installed. Use of the new system resulted in a net saving of more than 40 cents per square foot. Installation involved the use of approximately 90,000 lineal feet of "troffer beams" spaced on 5-foot centers throughout the manufacturing area.



Three troffer beams are shown here, two with continuous fluorescent lighting units already installed on either side in the background and one in the center without lighting

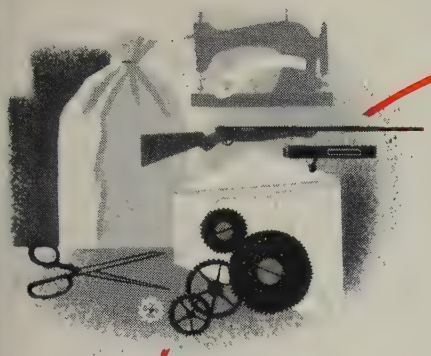
Troffer beams are trough-like structures of heavy gage sheet steel which besides serving as structural support for the ceiling installation, also become the raceway for the fluorescent lighting fixtures. The beams are spaced 3, 4 or 5 feet on centers for the support of the ceiling.

The desired level of illumination determines whether every or every second troffer beam is to be equipped with lighting fixtures. In this manner a wide range of illumination intensities may be covered. In most cases the fluorescent lights would be located 8 to 10 feet apart with the intermediate troffer beams covered over with ceiling tiles. If, after an installation has been made, changes in occupancy make it necessary to increase the intensity of the lighting system, ceiling tiles directly underneath the intermediate troffer beam can be removed and fluorescent lights with reflectors installed.

The beam is fastened to the supporting truss or roof beam with clamps, so that it is not necessary to drill or punch holes in the structural members. While normally the beams would be at right angles to the supporting beams or trusses, beams can be run parallel to the main roof trusses or beams, or even diagonally to them.

The troffer beam can carry ceiling loads, cat-walks, electrical conduit and other building service piping. In a physical test of the troffer beam at the Austin research laboratory, a concentrated load of 160 pounds was placed in the center of a 20 foot span with a deflection of only $\frac{5}{8}$-inch. Upon removal of the load the beam returned to normal position. This load is the equivalent of 160 pounds per foot uniform loading; when troffers are spaced 4 feet on centers this is a load figuring out to the equivalent of 40 pounds per square foot.

What'll You Have?



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HOT METAL CARS AND MIXERS

• • • *How Design Factors Affect Lining Life*

In the second of their series appraising refractories for handling hot metal, the authors discuss how equipment design, brick size, mortar quality and type of bricklaying all enter into determining how long linings will remain serviceable

PART II

By R. P. HEUER
Vice President

and

C. E. GRIGSBY
Service Research Engineer

General Refractories Co.
Philadelphia

SHAPE of hot metal cars and mixers has a pronounced effect on the life of the lining. In general, the best design is the one which has the best streamlining, with a minimum of corbels, jambs and right angle corners—especially at the ends and at pouring-in and pouring-out spouts of mixers. Streamlining design generally increases lining life by reducing the tendency of angular sections to wear rapidly.

Refractory consumption in the working lining of the mixer shown in Figs. 5 and 6 is 1½ to 1¾ pounds per ton of iron, with blast furnace-grade brick. A mixer of good design in the same plant uses only ½ to ¾ pounds of the same type refractory per ton of iron. Generally speaking, when lining life is very short, design changes alone will seldom yield any great improvement. Economics usually dictates a compromis between the ideal streamlined shape and a simple more angular contour, which permits maximum us of standard refractory shapes and a minimur of cutting on the job. Use of steel shelves, to inde pendently support the mixer roof and upper end walls (to permit sectional repairs), is increasing. Water cooling of critical wear areas has been little used although mixer designs are available having eithe cast wall or pipe coil coolers embedded in the refrac tory walls.

Fig. 5—Wear on jambs of pour-out spout of poorly designed 1300-ton mixer, in which end spout forces use of right angle jambs and gives long sweep of metal and slag along frontwall causing erosion such as shown in Fig. 6

Effect of Brick Size — There is an increasing tend ency to use special brick of very large size (up t 36 x 12 x 4 inches in mixers), because they reduc the number of joints. Unless such brick are made b the slow, expensive air hammer process, porosity i higher and resistance to slag attack is lower than o smaller brick. Very large brick are also more likel to be warped and cost per unit volume generally goe up as size increases.

Use of brick 12 to 18 inches long, 6 to 18 inche wide, and 3 to 6 inches thick, may prove more ecc nomical than smaller brick in some hot metal car and mixers. However when brick 24, 27, or 36 inche long are used, increased price per unit volume ma be out of all proportion to the benefit obtained.

Effect of Mortar Quality — Best way to minimiz wear at the joints, in hot metal cars and mixers, i to use a volume-stable mortar, made of a materia having inherently greater resistance to slag corrosio than material of which the brick is made. Whe brick and mortar are of the same composition, highl porous mortar is penetrated more rapidly and deepl by the slag and—since it is more finely ground—i fluxed away more rapidly than the brick. Thus joints become wider and deeper, and the end of th brick becomes correspondingly smaller—because th brick are soon subject to slag attack on five faces

Thin films of iron, trapped in the enlarged joint when the vessel is turned, are then oxidized mor rapidly, further increasing the rate of slag corrosio on all exposed faces of the brick. Eventually the en of the brick may become pyramid-shaped, knife-edged or even shaped like the sharpened end of a pencil—

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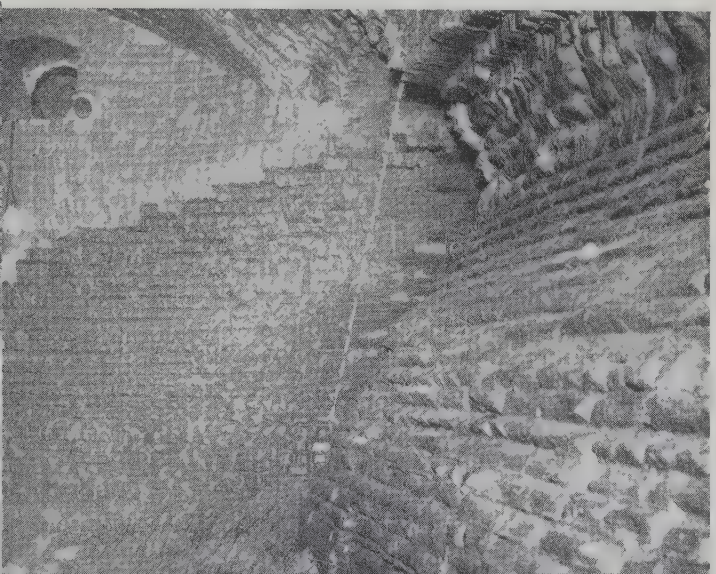
with the fire face little more than a point. The lining then resembles the mouth of a shark, full of rows of sharp teeth. This reduction of the brick's fire face is called "pencilling" and is typical of hot metal cars and mixers in which the mortar has less resistance to slag corrosion than the brick—as is usually the case. Figs. 7 and 8.

In addition to maximum resistance to corrosion by iron oxide, the mortar must also have a "just-right" degree of refractoriness to give the necessary hot strength to resist erosion by washing action of the metal. If not refractory enough, the mortar becomes soft; if too refractory, it develops insufficient ceramic bond. Thus, the best mortar, for any given ladle, is the one with the best balance of chemical and physical properties for the service conditions to be met. Since the mortar must be exactly suited to the temperature of each individual ladle, one ladle may require an entirely different type of mortar than another one using the same type of brick. In general, mortars which eliminate pencilling are more costly, but they usually prove most economical because they are used in small quantities as compared to brick. Thus, they greatly increase lining life, for a small percentage increase in total cost of refractories.

Effect of Bricklaying — Since pencilling of brick causes so much trouble in most hot metal cars and mixers, it is impossible to over emphasize importance of the thinnest possible joints. When using brick of standard sizes—as in the body of these vessels—all brick at the fire face should be wedges or keys, because arch brick are quickly loosened, and float out, if pencilling occurs. Generally speaking, bonded wedges should be used in the body of mixers, because keys increase the number of joints which are parallel to the direction of slag and metal flow, thus increasing pencilling. In submarine-type hot metal cars, choice between keys and wedges, for the cylindrical section, depends upon the relative speed and frequency of longitudinal and circular movement of the charge. Best shape can be determined only by service tests.

Fig. 6—Looking along frontwall toward pour-out spout at end of a poorly designed 1300-ton cylindrical mixer. Dotted line shows original lines of jamb of pour-out spout. Spout location gives long sweep of metal and slag along frontwall



In the cone ends of submarine-type hot metal cars, keys are usually used instead of wedges, to decrease the size of individual steps in the corbels. In order to save time, however, some plants prefer wedges, laid with the aid of metal arch forms in the cone ends. In vertical, semi-closed type hot metal cars, the cylindrical body should be lined with keys. There is an increasing tendency, in mixers of all designs, to use thicker linings in areas of greatest wear, and to deviate from the shell lines and simplify the inner contour of the lining. This is done to facilitate bricklaying and eliminate trouble areas in the wear on the lining. If lining thickness is increased too much, however, the reduced temperature gradient through the lining increases the rate of slag corrosion. Thus, even though the trouble area is eliminated, extra brick used in the critical area may result in increased cost per ton of metal. All new linings should be thoroughly dried and slowly heated to red heat or above before iron is introduced.

Patching Practice—No attempt is made to patch the brick or stone linings of most hot metal cars—except beneath the spout—but a few are patched with brick in other zones of increased wear, when the campaign is about half-finished. Attempts to patch these cars with plastic, granular, refractory material are sometimes made, but have not been generally successful. Some plants remove the car lining when a certain tonnage is attained—to prevent warpage of the shell. Monolithic linings—made of ganister and fireclay—used in the cars at a plant where the hot metal goes only to the pig machine, are patched regularly near the spout.

Critical areas in the linings of mixers are periodically maintained, in at least one plant, by a granular refractory material applied by a cement gun—thus prolonging the lining's service life. For this purpose, various types of acid and basic patching mixtures have been used—basic materials giving best results. Super duty fireclay plastic has been found fairly satisfactory for patching small eroded areas, in some mixers.

Service Testing—The most common, most expensive, and least dependable method of determining the best refractory for a given hot metal car or mixer, is the installation of complete linings of different types of brick on successive runs. This method wastes an enormous amount of time and money, and often leads to erroneous results, because it can give dependable results only when the campaigns being compared have practically identical service conditions (which rarely ever occur). Result of this method is usually a never-ending search for a better refractory.

Another common method is the testing of a large panel, in what is considered the most severe section. This method is much better, but is still not entirely dependable, because the zone of greatest wear is not always in the same location.

With acid refractories, the best method is to test several panels—each 4 or 5 feet square—in what is believed the most severe sections of each wall—then average the results. If a refractory is sufficiently superior, even a single brick will protrude sharply beyond the adjacent inferior brick, despite the extra

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ces exposed. By testing enough small panels of each a judicious selection of different types of acid fractories, it is often possible to determine the best ick for the service conditions in one or two test mpaigns.

Basic brick should not be tested adjacent to acid fractories, in the slag line area, because of possible action between the two types of brick, and because ear on the acid refractories could produce an acid ag which might damage the basic brick. Since id refractories are commonly used in most cars d mixers, panels of basic brick would be in contact ith acid refractories on all sides. They should, erefore, be tested as a band at least 6 to 8 feet gh completely around the slag line, so that the sic brick are in contact with acid refractories only ove and below the test panels.

Service Conditions In Cars — Service conditions hich the linings of hot metal cars of all types must ithstand are: Moderate thermal shock; chemical ttack by slags high in iron oxide; and washing ac- on of the metal during emptying, filling, and moving. he most important factors, which influence lining fe are: Type and thickness of lining; amount and ind of insulation; size and shape of brick used; ze and shape of the car; type of mortar; thickness f the joints and general quality of the bricklaying; mposition and temperature of the metal; thorough- ess of the skimming at the blast furnace; composi- on and quantity of desulphurizing agent added to he car; rate of travel; distance traveled; number f starts and stops; rate of change of speed; rough- ess of the tracks; number of pours; length of time he metal is in the ladle; length of time the ladle s empty; atmospheric conditions; frequency of re- ersing the car for both filling and emptying (turn- ng the cars once a month improves lining life); eight of the runner above the bottom of the car; nd whether or not scrap is added to protect the ining from the force of falling metal.

Most important single factor of all those listed— ssuming well-skimmed metal with no soda added— s temperature of the metal in the car, which usually alls within the range 2600-2750° F, when it enters he car. The metal temperature, when it leaves the ar, depends upon numerous factors, the most im- portant being: Temperature of the metal and lining when the metal enters; number of pours; length of ime the metal remains in the car; weather condi- ions; amount of scrap added; and type and thick- ness of lining and insulation. Oxides of iron and manganese—chief corrosive agents in most car and mixer slags—combine with most refractories used in these cars—especially with those of the alumina-silica types—producing highly fluid compounds well below the lowest temperature found in any hot metal car.

Since the amount of iron oxide greatly exceeds that of manganese oxide, in most cases, it is prob- able that the prime reason for short lining life often observed with high manganese metal, is the fact that temperature of iron often increases with increase in manganese. Poor skimming of slag from the iron at the blast furnace may add substantial amounts of lime—another corrosive agent—to the slag nor-

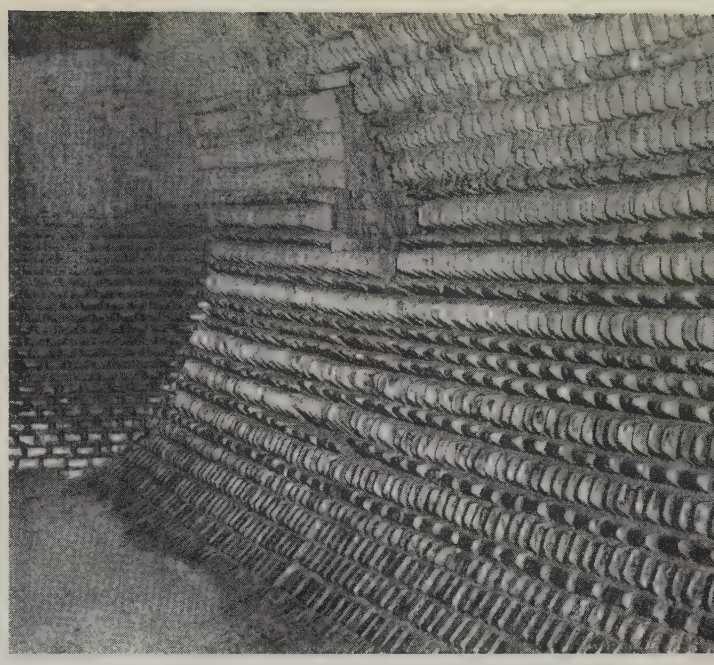
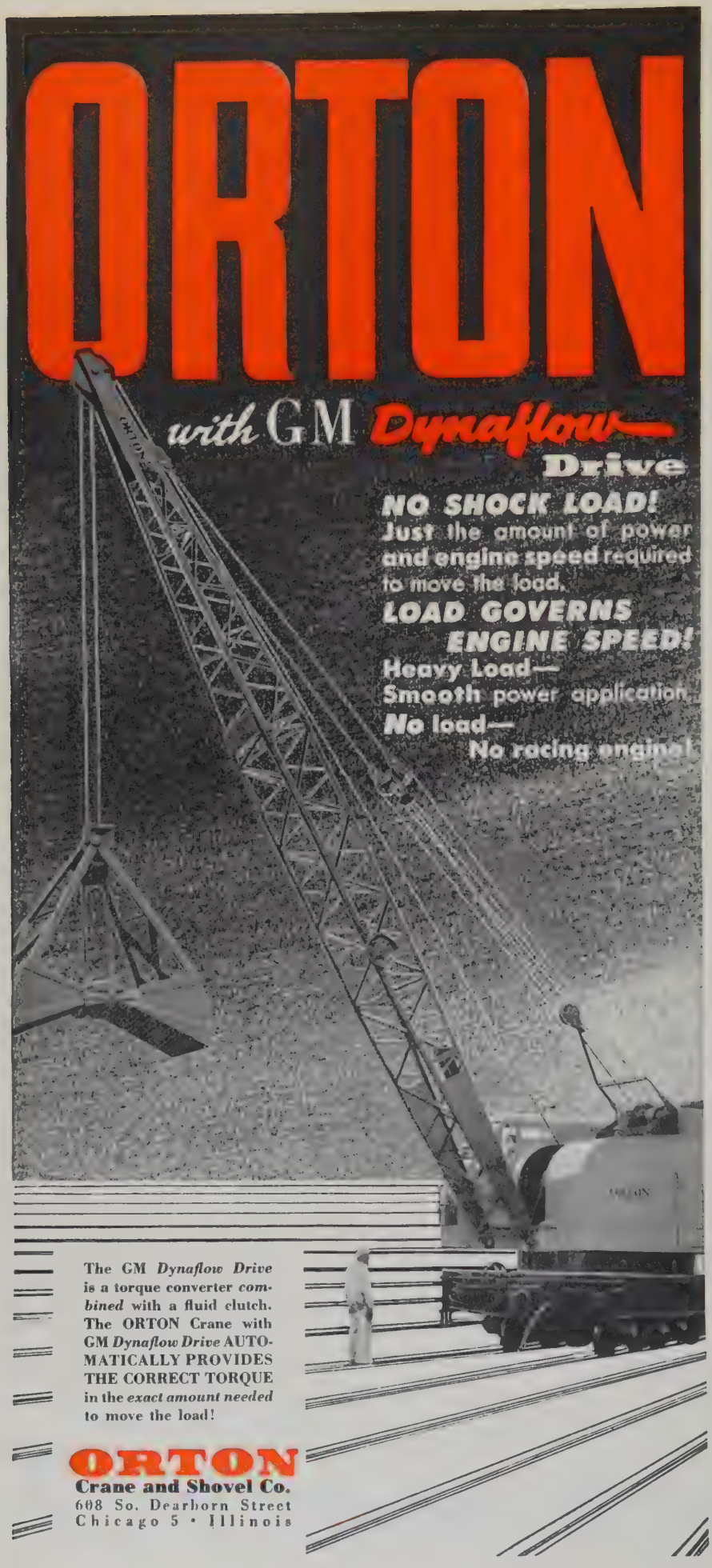


Fig. 7—Joint pencilling which is typical in a hot metal mixer in which fireclay brick is used with a mortar having less resistance than the brick to slag corrosion

mally formed in hot metal cars by oxidation of elements in the metal. When soda is added to the hot metal car itself, corrosiveness of the slag is greatly increased—rate of wear increasing with increase in amount of soda added per ton of iron, and with higher metal temperatures.

Where Wear Is Greatest — Locations of greatest wear are usually around the openings where metal is poured in and out; in the area on the belly or sides immediately beneath the spout where the metal stream hits the surface of the unprotected refractories; around the slag line area; and on the cone ends. In some cases, the falling metal strikes too high on the car side, and does not hit the pool of metal until the ladle is one-half to three-quarters full. The result is that, even with frequent reversals of the car, the lining below the spout, where the metal hits it, is gutted out long before the rest of the lining is so badly worn. In such cases, as well as in normal operation, life of the lining may be materially increased by depositing runner scrap, ladle skulls, etc. in the empty ladle between casts. Submarine-type cars are sometimes provided with spouts having an opening larger than normal, to permit the melting of ingot butts—which are hard to recharge into the open hearth, unless they are cut into small pieces by means of oxygen torches. By acting as a baffle for the iron to strike first, the scrap reduces the force with which the metal hits the soft, yielding surface of the refractory lining—thus reducing the rate of wear. Method of handling the car—number and speed of starts and stops and roughness of tracks—governs the amount of splashing, and the rate and frequency of horizontal movement of slag and metal along the lining. All of these have a direct bearing on the length of service given by the lining—rate of wear being increased by increase in splash and movement of slag and metal. Such movement removes partially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neutralized slag from the lining and keeps the brick surface exposed to fresh, highly corrosive slag.

When the hot metal car is used only for transporting iron to the pig casting machine, the iron is usually in contact with the lining for so short a time that tonnage per lining is greatly increased. In one plant, where the cars are so operated, monolithic linings of ganister and fireclay, produce 200,000 to 300,000 tons per lining. This unusually high tonnage is obtained by virtue of patching each lining several times in the zone of greatest wear, near the spout, before it is removed. This is almost double the best life—125,000 to 180,000 tons—obtained from brick linings, in cars which are held at the open hearth until they are empty.

Thus, the new theory advanced above on mixers, viz., tonnage per lining often increases with increased tonnage per day—i.e., shorter time in the mixer—also applies to hot metal cars as well. Temperature of the lining, when the metal is introduced, determines the softness of the lining when the metal first hits it, thus affecting the rate of erosion. Addition of as much as 5 per cent scrap to the car between casts not only protects the lining from erosive force of the falling metal—it also cools the metal and slag. Although the amount of cooling is not great, it may be enough to prevent the temperature from exceeding the critical level, thereby decreasing the rate of slag corrosion on the lining. The practice of cooling the lining to 2000° F or below by air, steam, or water sprays between casts generally increases lining life, providing no spalling occurs.

Oil Quenching Case History

Solution to difficult quench oil purification problems at Salisbury Axle Works, division of Dana Corp., Fort Wayne, Ind., is discussed in new, specially prepared case history, published by and available from Honan-Crane Corp., Lebanon, Ind.

Entitled "Oil Quenching," it describes and illustrates Salisbury's three 1500-gallon oil quenching systems for heat-treating of automotive gears. It reveals how purifiers reduce and maintain sediment content of quenching oil well below maximum tolerance of 0.04 per cent, keep piping systems clean, free of contamination such as scale and other foreign matter which collect in tanks, pumps, feed lines and cooler tubes and eliminate down time and cleaning problems since contaminants are removed from oil during the quenching process.

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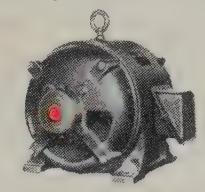
It's easy to select the proper electric motor for your job from Century's complete line — from 1/6 to 400 horsepower. A wide range of types and kinds are available to satisfy all popular requirements. They are carefully designed, built and tested to assure maximum performance throughout their long life.

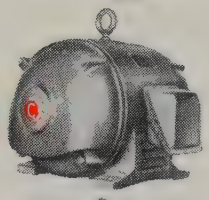
Here are examples of Century's line of INTEGRAL HORSEPOWER motors.

Polyphase

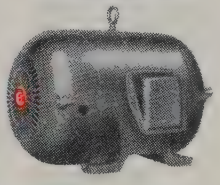
TYPE SC—Open Drip proof General Purpose Motor. Meets the needs of most installations where operating conditions are relatively clean and dry.



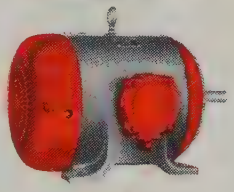
TYPE SC—Splash proof. Supplies protection where plants must be washed down. Keeps out all falling or splashing liquids—rain, snow, sleet, etc.



TYPE SC—Totally Enclosed Fan Cooled. Protects against dusts, mist, oil, fog. Inner frame protects vital parts of the motor, seals out harmful matter.

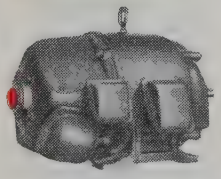


TYPE SC—Explosion proof. Protects life and property in atmospheres charged with explosive dusts or gases.



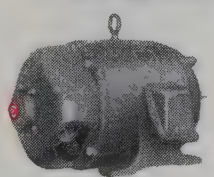
TYPE SR—Wound Rotor. Open Construction. Ideal for applications requiring low starting current with high starting torque, reversing or adjustable speed.

TYPE SR—Wound Rotor Splash proof. Same electrical characteristics as motor shown above. In addition, gives adequate protection against falling and splashing liquids.



Single Phase

TYPE RS—Repulsion Start Induction, Open Construction, Single Phase Brush Lifting Motor. Combines high starting torque with low starting current.



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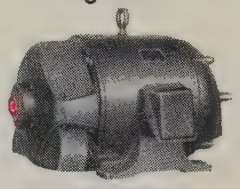
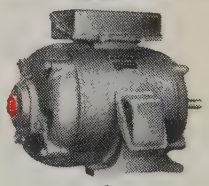
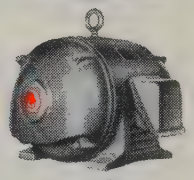
TYPE RS—Splash proof. Same advantages as open construction, plus protection against splashing and falling liquids.



TYPE CSH—Capacitor Start Induction, Single Phase Motor. Suitable when high starting torque with normal starting current is satisfactory.

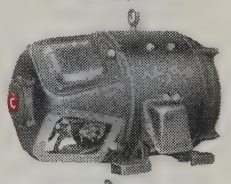


TYPE CSH—Splash proof. Same advantages as motor shown above, plus protection against falling and splashing liquids.

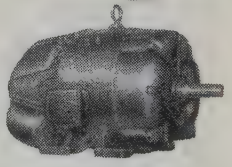


Direct Current

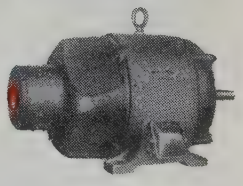
TYPE DN—Direct Current Motors. Suitable for use where direct current is available, or its use desirable.



TYPE DN—Direct Current, Splash proof.



TYPE SY—Synchronous. Suitable for continuous operation at a uniform load for power factor correction.



In addition to a complete line of integral horsepower motors, Century offers fractional horsepower motors, gear motors, generators, AC and DC motor generator sets.

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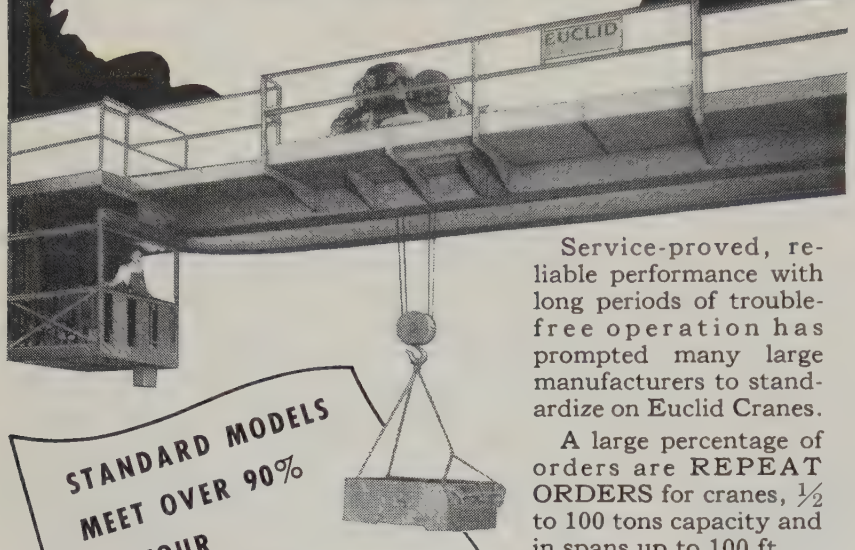

Service-proved, reliable performance with long periods of trouble-free operation has prompted many large manufacturers to standardize on Euclid Cranes.

A large percentage of orders are REPEAT ORDERS for cranes, ½ to 100 tons capacity and in spans up to 100 ft.

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Quality Control

(*Concluded from Page 74*)

Lundberg even that initial expens was modest. The developing and set ting up of the program, as far a the company has gone, has cos nothing over and above regular in spection expenses except for th printing of special record and char forms. Today Lundberg uses five in spectors to cover the multiple shif operations where it uses the system "We would require at least the same number of men to cover those groups using the old floor or group type o inspection," says Mr. Muir. The en tire program is administered by Mr Muir and one working group leader

Most people experienced in statistical quality control have this advice to any company wishing to start from scratch: Get a good man to run your program; be prepared to wait two years or more before you get concrete results; start small with just part of your operations; be prepared to adapt the basic statistical controls to your plant—some controls won't work well the first time.

Furnaces for Defense Work

Prompted by the growing evidence that demand for new industrial furnaces needed for heat treatment of aluminum and steel defense items is moving beyond the capacity of the producers of such equipment, the Government Business Committee of the Porcelain Enamel Institute has compiled a comprehensive report of defense work possibilities for porcelain enameling furnaces.

According to E. W. Dany, chairman of the subcommittee making the survey, the project was undertaken to assist institute members in converting their porcelain enameling furnaces to defense work and to suggest specific defense applications. An inventory of available furnaces also was made.

It was found there are approximately 350 batch-type and 250 continuous monorail-type enameling furnaces in the United States. All enameling plants also have pickling facilities—a fact the committee considers to be of equal importance to the furnace in some heat treating operations, i. e. removal of scale to prolong die life.

According to the committee, batch type furnaces could be used for annealing and hardening various steel products with a minimum of furnace changes. The report outlines proper conversion procedure as well as additional changes needed for heat treatment of aluminum. Several specific conversion and heat treatment projects accomplished during World War

are described, involving such items armor plate, tank treads and dovel blades.

The report also outlines conversion rocedure for continuous monorail-ameling furnaces and describes tual use of these furnaces for at treatment of 14-foot lengths armor plate, bombs, and steel rtridge cases. It is pointed out at most porcelain enamel plants ve press equipment which could be ilized in the stamping of steel cart-dge cases, and that in many other ses individual plant factilities will uable production operations in con-nction with heat treating.

The committee estimates that utiliz-g only half the furnaces in the por-lain enamel industry for heat treat-g would result in a daily output approximately 36 million pounds.

ew Roller Bearing Standards

A new 20-page American standard tolerances for ball and roller bear-gs is announced by the American tandards Association, New York. It the second of a series of antifric-on bearing standards under devel-pment by a committee representing 4 trade associations, technical so-ieties, and the U.S. Army and Navy. his standard establishes tolerances nd limits of size governing dimen-ional interchangeability of various ypes of bearings. Compliance with hese tolerances should be checked in ccordance with the American stand-rd gaging practices for ball and oller bearings, B3.4-1950.

The standard contains 15 tables pecifying tolerances on the bore, utside diameter, width, and other haracteristics of a bearing in differ-nt grades of accuracy required for various bearing applications. Types f bearings covered are: Annular all; cylindrical roller (including jour-hal); magneto; airframe; thrust all; industrial and airframe needle; nd tapered roller bearings.

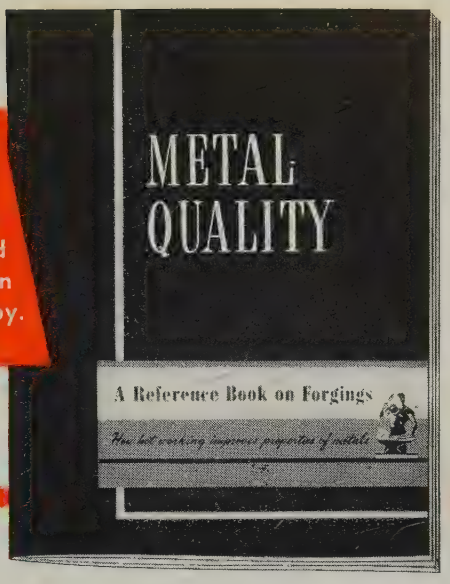
Specifications are given also for he maximum permissible variation n diameter between the largest and smallest ball or roller in any assem-bled bearing; for the hardness of balls, and rollers; and for snap ring and groove dimensions.

Kit for Carbide Conservation

To help carbide tool users extend the production life of critical carbide tipped cutting tools, Industrial Prod-ucts Division of Elgin National Watch Co., Elgin, Ill., announces the avail-ability of a special carbide conserva-tion kit, for lapping carbide tools.

Contained in the kit are a 6-inch

Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.



Never underestimate the preference of users of your product for the factor of greater safety that is inherent in forgings. This factor of greater safety results from toughness and strength, in correct proportion, as found only in closed die forgings. Consult a forging engineer about the mechanical properties required for your product.

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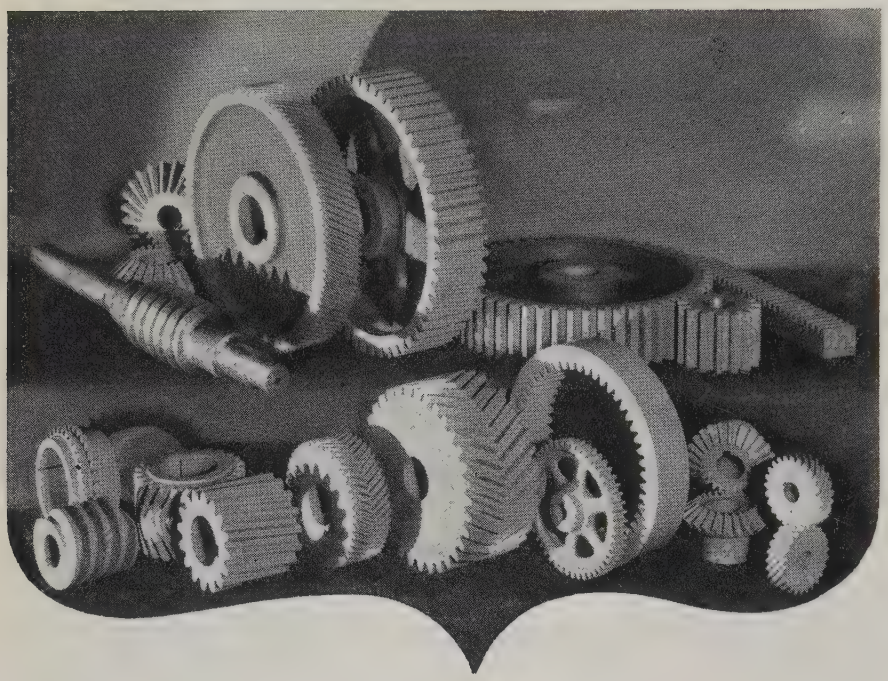

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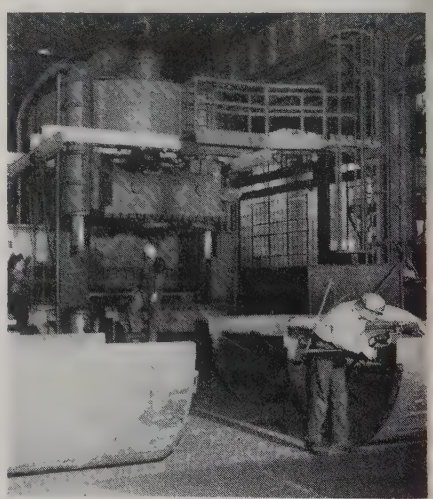
diameter formica lapping wheel, a Dymo applicator gun specially modified to facilitate charging of the wheel and 5 grams of Elgin's Dymo diamond compound, sufficient for lapping approximately 500 average, single point carbide tipped tools. Further information and prices are available from the company.

Mill Changed Over in 66 Hours

Westinghouse Electric Corp. completed installation of main drive and auxiliary equipment in 66 hours at the Weirton Steel Co., subsidiary of the National Steel Corp., in Weirton, W. Va. Mill operating speed was increased from 1500 fpm to 3100 fpm by the use of larger horsepower motors. The new motors and auxiliaries were installed while the mill continued in operation and the changeover was made during a shutdown for revamping the mechanical equipment. Weirton's No. 5 tandem mill handles coils up to 36 inches wide and rolls a wide range of strip thicknesses, finishing 0.007 to 0.050-inch from 0.080 to 0.095-inch hot rolled bands.

Main drive motors are 1000 hp, 100-275 rpm single armature; 2500 hp, 150-350 rpm single armature; 3000 hp, 250-500 rpm double armature; and 3000 hp, 312-625 rpm double armature. Reel motor is 600

Vessels Handle 70,000 psi



FABRICATING plate up to 5½ inches thick into pressure vessels, condensers and related equipment is a big job at Foster-Wheeler Corp., Cartaret, N.J. Finished products must withstand pressures up to 70,000 psi. Flat sections are heated in a nearby furnace and then formed in the press shown above. Workman at the right is setting up a flame-cutting tractor used to bevel sections for subsequent welding by GE submerged-arc machines

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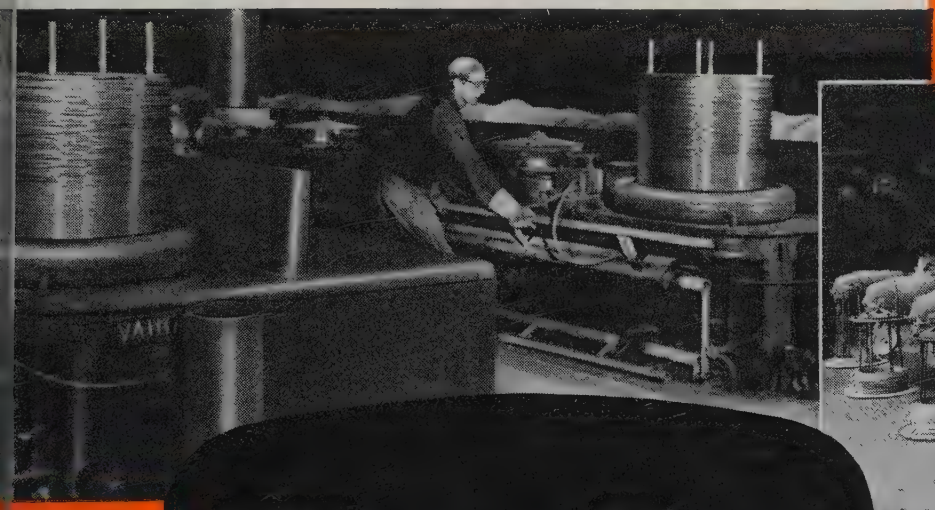
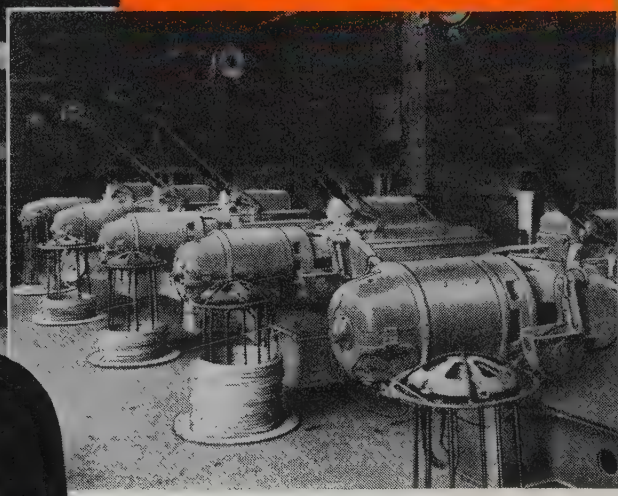
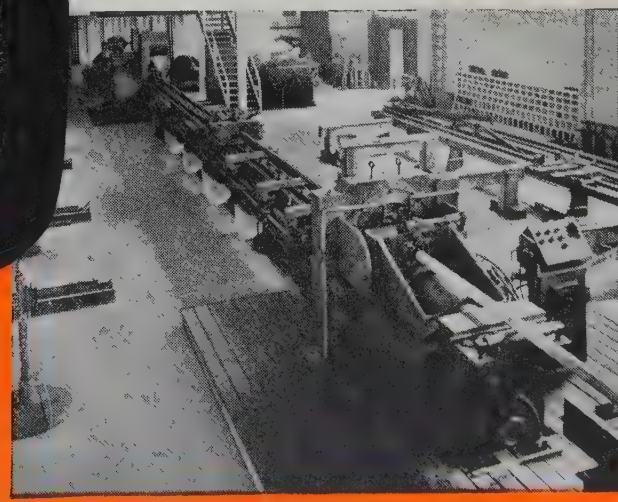




CONTINUOUS MACHINES ↑ DRAW BENCHES ↓



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● You'll be amazed at how many hundred pounds of high-dollar scrap iron and steel your plant is harboring . . . old and obsolete dies, tools and machinery, broken parts, unreturned scrap clippings and blankings, and just plain junk.

Prices for scrap are high today . . . call your scrap dealer . . . make old machinery help pay for new, efficient machines.

Shortages of steel can be eased if you get this scrap on its way through dealers to steel mills . . . every ton of scrap helps make 2 tons of new steel.

Tell your plant foremen to start gathering scrap today . . . survey your machinery inventories for old, useless "clunkers."

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hp, 180-720 rpm double armature. Power supply is from individual generators including a 5-unit motor generator set with separate generators for stands 1 to 3 inclusive and the reel. An existing motor generator set is used on the fourth stand. Rototrol controllers are used for speed of response to prevent overshoot.

Aircraft Designers' Catalog

Publication of a new aircraft designers' catalog of Speed Nut fasteners is announced by Tinnerman Products Inc., Cleveland. Devoted exclusively to fasteners for military and civilian aircraft, the new aircraft parts catalog No. 500 lists all the aircraft fasteners manufactured under Mil-N-3337 specifications, which govern sheet spring nuts for all branches of the military government.

The new catalog gives detailed specifications for fasteners, as well as their possible applications, and also shows how the fasteners are developed, engineered and manufactured for specific jobs.

It was also revealed that Tinnerman has resumed production of the same fasteners it made during World War II for the attachment of component parts to airplanes. The company also is developing a wide variety of new types, both for military airplanes and for many other types of military equipment.

New Finishes for Zinc

United Chromium, New York, has added two new compounds to their line of Unichrome dip compounds for decorative and protective finishing of zinc. The additions, identified as Nos. 1060 and 1070, are used to produce corrosion-resisting, chromate-type conversion coatings black or olive drab in color. The finishes are produced on a metal-conserving deposit of 0.0002 to 0.0005-inch of zinc. The process is a simple dipping one which can be carried out at room temperature.

Forging Practice Explained

A series of illustrated technical articles on the uses of the modern forging machine, together with the latest developments in hot upset forging practices are being made available by the Hill Acme Co., Cleveland, manufacturers of forging machines. Four of these articles have already been sent out at monthly intervals, and additional numbers are being written by well-known authorities on the subject. The ultimate purpose is a compendium of modern forging practices which can be used as a textbook for the industry.

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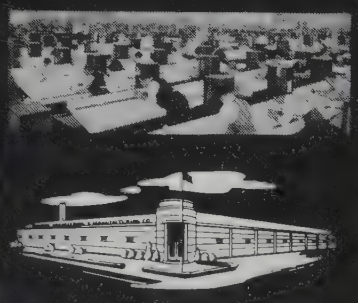

PIONEER ENGINEERING & MANUFACTURING CO., INC.

ENGINEERS, DESIGNERS, CONSULTANTS AND PRODUCTION SPECIALISTS

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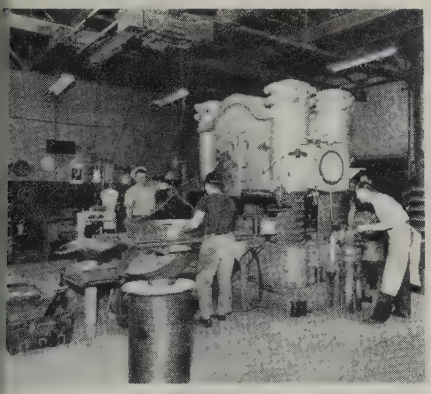
INQUIRIES PROMPTLY ANSWERED

Hydraulic Presses Form Homogeneous Wheels

UNIFORMITY of internal structures and close dimensional tolerances of Simonds grinding wheels are attributed largely to the close pressure control of the hydraulic presses utilized to form the "green" wheels. A number of hydraulic presses, ranging in capacity from 130 tons to 3000 tons, are being used in the Philadelphia plant of Simonds Abrasive Co. in the manufacture of grinding wheels. These wheels range in size up to 48 inches in diameter and 6 inches in thickness.

The presses are used in making both resinoid and vitrified bonded wheels, the two principal types of

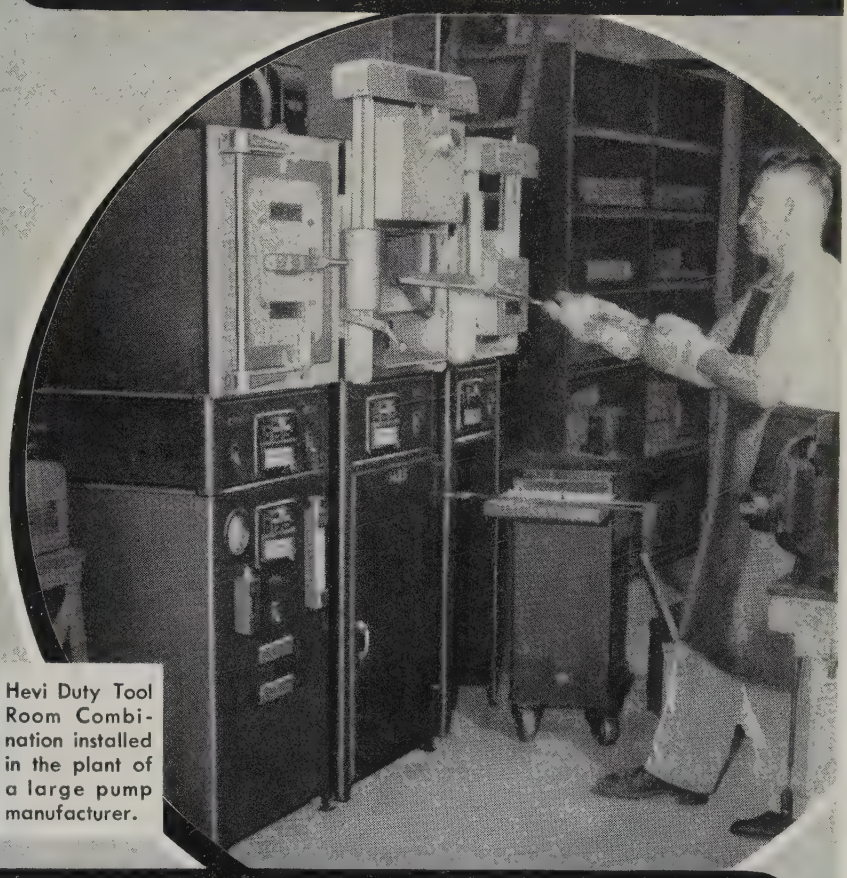


grinding wheels in common industrial use, from a mix consisting of particles of abrasives and bonding materials.

In both these presses, operating levers control the speed of ram movement in either direction and the rate of load application. Excessive loads are prevented and compression loads closely regulated during press operation by means of controls on the pressure valve and a pressure gage in view of the operator. There can be no impact loads. On the 3000-pound Baldwin press, the controls and gage are on the side of the press at right angles to the direction of feed through the press. Tables specially designed for the preparation of molds and their removal after the mix is compacted are located on the feed and delivery sides. During the compacting process pressure is held below maximum for a brief period before the total compacting pressure is applied.

For the production of a large grinding wheel the mix is weighed in four scoops and poured into a hopper from which it is distributed into a motor-rotated steel mold on the feeding table. This mold consists of a round steel plate with a hole in its center and closely fitting center ring and circumferential ring. Uniform

The HEVI DUTY Tool Room Combination



Hevi Duty Tool Room Combination installed in the plant of a large pump manufacturer.

for Precision Heat Treating of Tools and Dies

This Hevi Duty combination is a complete, low cost heat treating unit for tool rooms and small manufacturers. The "Temperite," air draw tempering furnace, "Treet-All," multipurpose furnace, and "Alloy 10," high temperature furnace, provide temperatures from 250° F to 2350° F. Prepared atmospheres are supplied by the "Atmo-Gen." Furnaces and the "Atmo-Gen" are available separately.

Send for bulletin HD 1147

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HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

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OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

Making

BEST USE OF AVAILABLE STEEL

In times of emergency, substitutes can often be used to good advantage.

Right now, the urgent requirements of production for national defense are taking the lion's share of high-grade alloying materials.

That is as it should be, of course. But the fact remains that many manufacturers are being confronted daily with knotty problems of production.

Frequently these difficulties can be solved by using substitute grades or alternate methods of manufacture and treatment.

To help you decide *which* substitute grades you can use and *how* you can use them most effectively, call on our staff of metallurgical experts.

A letter — or a phone call — will focus Wheelock, Lovejoy's specialized technical skill and long experience on your individual problems.

And we'll be delighted to be of service.

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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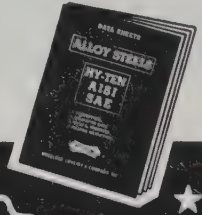

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thickness of the mix is produced by the edge of a smoothing plate. A closely fitting reinforced steel cover plate is laid on the mix to complete the mold. The mold is then pulled into the press by means of a small overhead crane and wire cable working over a stationary sheave.

After the mix has been compacted into a wheel of the desired density, the mold is pulled on through to the opposite side of the press where wheel and mold are separated by a smaller hydraulic press. The "green" wheel is then carried by overhead crane to a skid which is stacked with others for transfer by lift truck to a temporary storage area for drying. A crew of four men handles production of large size abrasive wheels.

In general, Simonds grinding wheels consist of two principal types of abrasives: Fused crystalline aluminum oxide (Borolon), which is the most widely used, and silicon carbide (Electrolon). Various types and a wide range of grain sizes are used to meet every requirement. In addition to the vitrified bonding agents there are resinoid materials of the phenol formaldehyde type, silicates and shellac. Probably 90 per cent or more of all wheels are made with vitrified and resinoid bonding agents.

In vitrified bonded wheels the abrasive cutting particles are held in position by blended clays and other ceramic materials fused or vitrified at high temperature. Both periodic and continuous type kilns are used in the firing process with accurate and automatic temperature control.

Blades Broached 60 per Hour

For accelerated production of turbo-supercharger wheels and mating blades, Lapointe Machine Tool Co., Hudson, Mass., has developed a broaching procedure based on its single ram vertical broaching machine. Company handles both jobs on a 15-ton, 90-inch stroke machine through the use of interchangeable fixtures.

The wheel fixture embodies completely automatic indexing and hydraulic clamping. The blades are broached two at a time—the first blade being rough broached, and the second one finished broached, at the same stroke of the machine. Conventional tools are used. Fixtures for both the wheel and the blades are mounted on in-and-out tables. The wheel is a conventional forging. The blades are broached from bar stock Timken alloy 16-25-6.

Based on 80 per cent efficiency the time required for broaching the complete wheel, with 32 pine-tre

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slots, is 65 minutes. The blades are broached at a speed of 60 finished blades per hour. Very close tolerances are maintained — within 0.0005 to 0.0007-inch. Closer accuracy than this can be obtained, it is claimed, even with the production speed indicated above.

Measures Enamel Adherence

A new instrument for accurate measurement of porcelain enamel's adherence to metal now is available for use by the industry's laboratories, according to the Porcelain Enamel Institute. The result of more than four years of research, the adherence meter evaluates adherence of porcelain enamel to steel by electrical contact, thereby eliminating the variable human factor involved in previous adherence testing methods.

The degree of adherence has long been considered an important criterion of the quality of porcelain enamel ground coats, but industry previously has relied, for testing, on a visual estimate of the amount of bare metal exposed within a given area on a porcelain enameled specimen after it had been deformed in a specified manner. Since porcelain enamel normally is an electrical insulator, the basic principle of the adherence meter depends upon the completion of an electric circuit through the metal of the deformed specimen to a steel probe touching the test area. By using a large number of probes, and counting the number that conduct a current during testing, an accurate determination in terms of numerical units can be made of the area that has been exposed.

Adaptable to metals from 13 to 24 gage thick, it can be used on many production parts as well as laboratory samples. Ordering information may be obtained from the Porcelain Enamel Institute, 1010 Vermont Ave. N. W., Washington 5, D. C.

Fitting Standard Revised

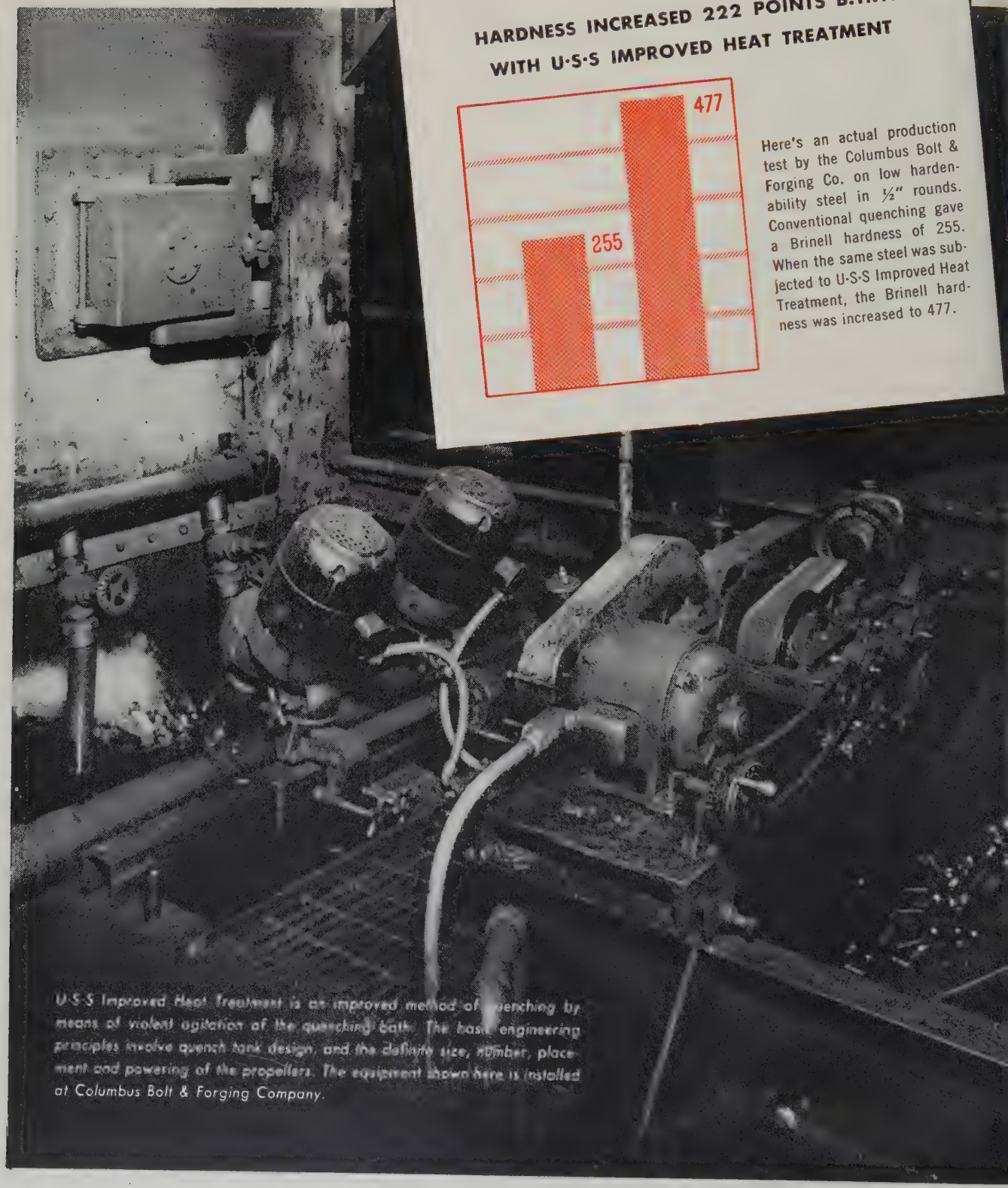
A revised edition of the American standard for steel butt-welding fittings was recently approved by the American Standards Association, 70 E. 45th St., New York 17, N. Y.

These fittings are for pipe lines for which mechanical joints are not solid enough and which need more permanent fittings, such as pipelines carrying very high temperatures; pressure steam lines; cross-country lines; and all oil refinery pipe lines.

In the new edition all series of fittings are given in sizes from 12 to 24 inches inclusive. The standard contains tables for tolerances; long radius elbows; 180-degree returns;

HOW TO GET THE MOST OUT O

—keep a sharp ey



HARDNESS INCREASED 222 POINTS B.H.N. WITH U·S·S IMPROVED HEAT TREATMENT

Here's an actual production test by the Columbus Bolt & Forging Co. on low hardenability steel in ½" rounds. Conventional quenching gave a Brinell hardness of 255. When the same steel was subjected to U·S·S Improved Heat Treatment, the Brinell hardness was increased to 477.

U·S·S Improved Heat Treatment is an improved method of quenching by means of violent agitation of the quenching bath. The basic engineering principles involve quench tank design, and the definite size, number, placement and powering of the propellers. The equipment shown here is installed at Columbus Bolt & Forging Company.

THE ALLOY STEEL YOU'RE GETTING on quenching methods

TODAY, as critical alloying elements become scarce, all users of alloy steel are faced with the necessity of getting the most out of the steel they're receiving.

In most cases, this puts the problem squarely up to the heat-treater. Better heat-treatment methods can often do the job.

If you encounter difficulties, don't be too quick to blame the steel or the heating practice. The answer may be better *quenching* methods. More specifically, your problem might be solved with U·S·S Improved Heat Treatment — a superior quenching technique developed by United States Steel.

U·S·S Improved Heat Treatment extracts heat rapidly and *evenly* from every part of the material's surface. This treatment assures accurate timing, allowing removal of the material from the quenching bath while a certain amount of residual heat is present. Elapsed time from quench to tempering treatment is held to an absolute minimum. This not only improves mechanical properties; it also reduces cracking. And, this quenching method improves machinability by minimizing the formation of free ferrite in hypo-eutectoid steels.

The use of this quenching process is available to you without charge.

United States Steel does not manufacture or sell heat-treating equipment, but our metallurgists will be glad to analyze your heat-treating methods and make suggestions that may give you more uniform hardness, less rejects and less retreatment.

UNITED STATES STEEL COMPANY, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY
WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

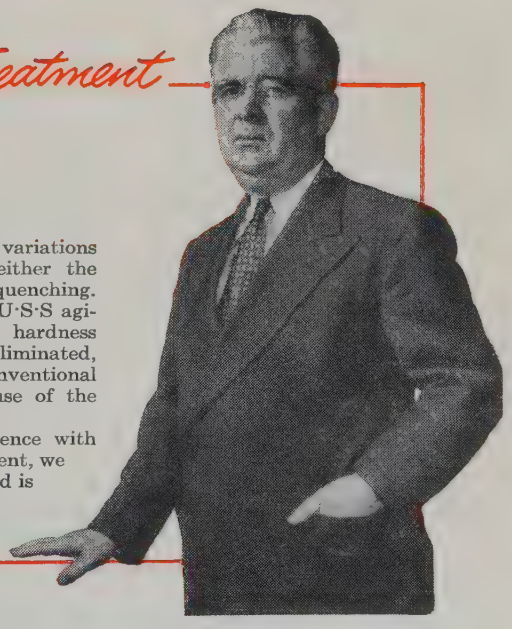
Comments on U·S·S Improved Heat Treatment

by Mr. R. E. Christin, Chief Metallurgist
Columbus Bolt & Forging Co., Columbus, Ohio

"Quenching is a process often neglected in heat treatment. We feel it is just as important (if not *more* important) than any other phase of heat treatment. There is a tendency to concentrate too much on the heating—and lay too much blame for failure to the heating—when proper quenching could produce the objectives desired. Heating, even in the ideal environment, can be inadequate if quenching is faulty.

"Before we installed U·S·S Improved Heat Treatment, we occasionally encountered hardness variations in the as-quenched condition. These variations were loosely attributed to either the steel, or the heating or the quenching. However, after adopting the U·S·S agitated quench process, these hardness variations were practically eliminated, obviously indicating that conventional quenching was the chief cause of the hardness variations.

"After seven years' experience with U·S·S Improved Heat Treatment, we are convinced that this method is the answer to most hardening problems."



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ELECTRIC FURNACE OR OPEN HEARTH

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UNITED STATES STEEL

Maximum Production in Limited Floor Space with FOSTORIA INFRA-RED

for

FINISH BAKING
DRYING
DEGREASING
SOLDERING
PREHEATING
DEHYDRATING
ETC.

Read these Results Typical of Thousands of Fostoria Infra-Red Installations

"When you have limited floor space and want to get out maximum production, this is the only efficient way to do it," says H. O. Buschman, Plant Engineer at Perfection Stove Co., Cleveland. The Fostoria oven requires only half the floor space previously needed for a fuel fired oven. A variety of furnace panels, bases, etc. are now finish baked in 6 minutes at the rate of 80 pieces per hour. The flexibility of the Fostoria oven permits switch control of each bank for full or half voltage to vary heat intensity according to production requirements. All handling is eliminated except at inspection and transfer points.

Throughout industry, new high standards of production efficiency are being set by utilization of the Fostoria Infra-red System. Savings in "per piece" production cost are substantial with many additional advantages on both large and small operations. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate the high efficiency of Infra-red ovens as engineered by Fostoria. Case histories of installations applicable to your production are available on request.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER—MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.

GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on this Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

straight tees; reducing outlet tee lap-joint stub ends; caps; and r ducers. For the first time, heavy wa caps are listed. A complete series 78 reducing outlet tees, from 1 to inches, has also been added.

Broaching Cycle Is Automatic

Duplicate sets of manually ope ated fixtures and associate tools i stalled on an Oilgear double sli vertical surface broaching machi are used to finish broach four su faces on forged steel steering knuck spindles at the rate of 410 parts p hour at 85 per cent efficiency. A proximately 0.040-inch stock is r moved from each surface. As o shuttle table moves outward to loa ing position, the other table mov inward and is preloaded in broac ing position to resist peak tonnag tool face thrust.

One fixture is loaded while spind in other fixture is being broache With automatic cycle, operator mer ly raises lever on fixture to relea and move clamping arm to the rig and also disengage both locating pi from king pin holes. Broached part removed and new part inserted place. Lever on fixture is depresse to insert locating pins in king p holes, move clamping arm to the le and clamp spindle in place. Maximu cutting speed is 30 feet per minute.

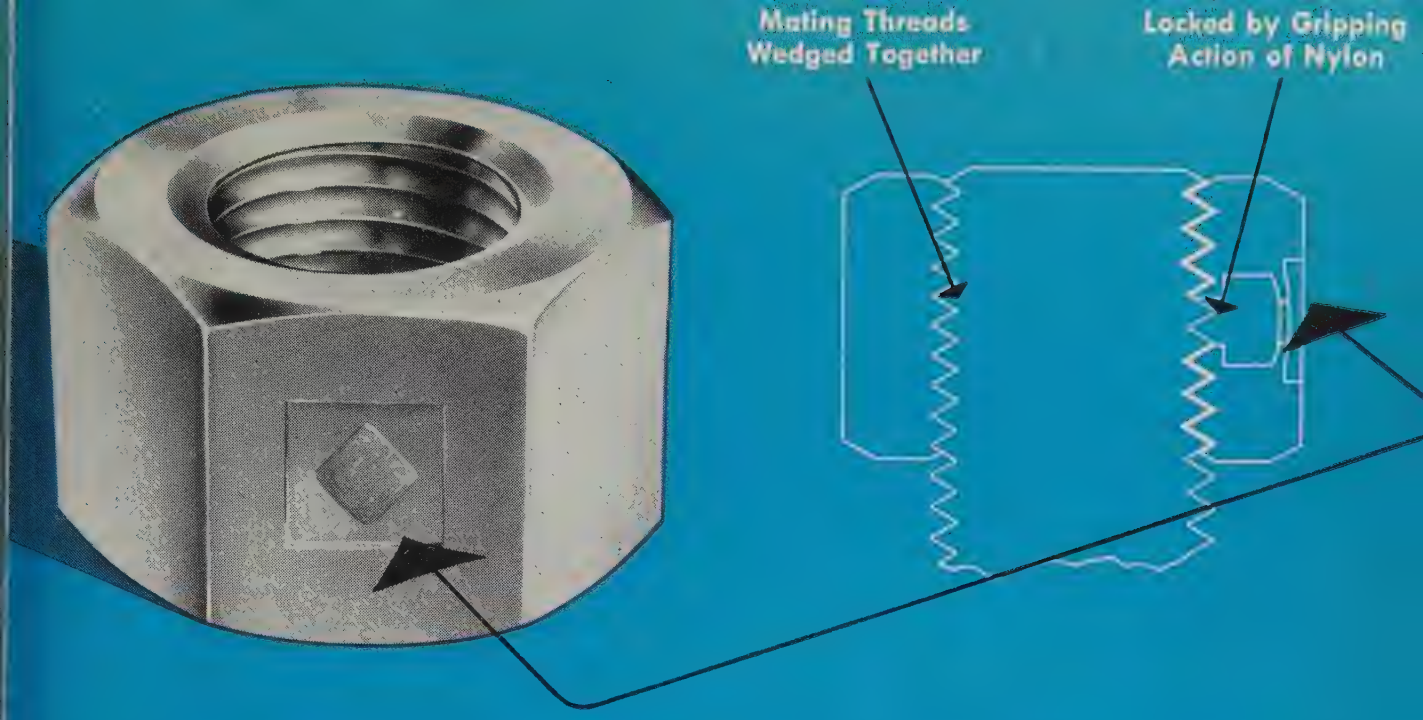
Solves Heat Transfer Problems

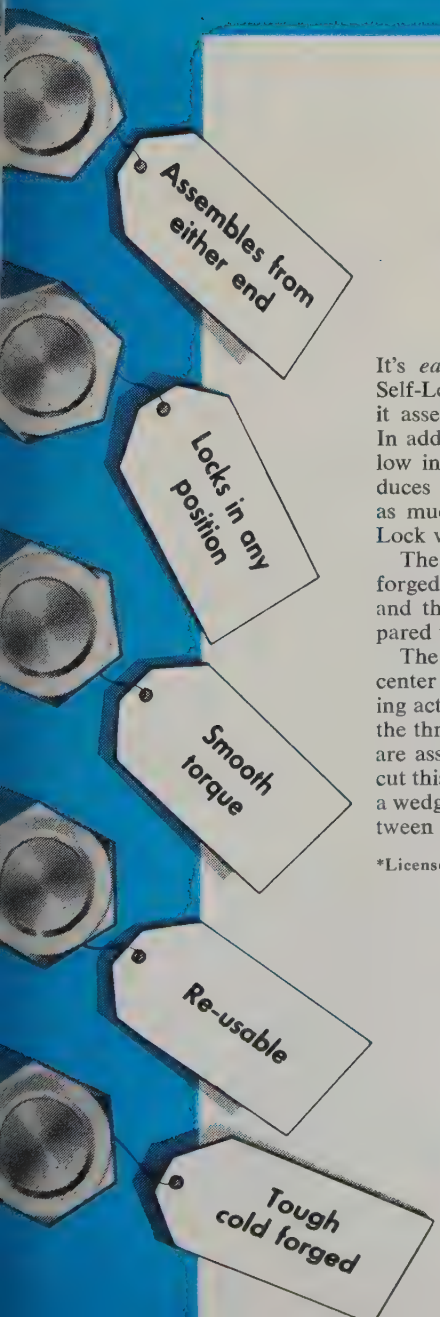
Laboratory data on the use Platecoils as a medium of heat e change is available in a new tec nical manual published by the Plat coil Division of the Kold-Hold M Co. These data are based in part the results of an extensive resear program conducted by Battel Memorial Institute, Columbus, O., i volving all styles and representati sizes of Platecoils.

The technical manual provides t engineer with the principal data r quired in the solution of heat transf problems. It simplifies the proce of selecting and applying industri heat transfer equipment by suppl ing charts and formulas to aid in t basic calculations of industrial hea ing and cooling applications.

Management Proceedings Reac

Proceedings of the 14th annu time and motion study and manag ment clinic sponsored by the Indu trial Management Society are ava able. The volume consists of 1 pages including charts, forms a illustrations. It also contains co plete transcripts of talks by top lea ers of labor, management and go ernment time study motion econom methods, plant layout, materia





Easy Does It With
Townsend Nylok Locknuts

It's *easy* to install the new Townsend Nylok Self-Locking Nut* as it has no top or bottom—it assembles readily even in blind applications. In addition, you get positive locking action with low installation torque. This saves time and reduces scrap losses due to seizing and galling by as much as 80% over other types of locknuts. Lock washers and jam nuts are eliminated.

The Townsend Nylok Type "E" Nut is cold forged to provide added strength in the body and threads and to save critical material compared to nuts machined from bar stock.

The small nylon plug insert located in the center of one of the hex faces provides the locking action. This plug extends beyond the crest of the threads in the nut and when the nut and bolt are assembled the bolt compresses but does not cut this nylon plug. The nylon plug then reacts as a wedge creating strong metal to metal action between the male and female threads.

*Licensed under The Nylok Corporation patents.

Nylok nuts lock in any position. Seating is unnecessary. Due to nylon's ability to retain its original shape, these nuts can be used again and again. This feature makes it especially desirable in setting adjustment screws. Nylok nuts have high tensile strength, excellent heat resistance and are unaffected by most chemicals.

The Townsend Nylok Locknut is available in American Standard Light (E-6) and Light-Thick (E-7) series—in sizes ¼" through ⅜". It is a suitable companion to Townsend's Tufflok Nut which is a one-piece cold forged nut, with a hexagonal fibre washer as the locking medium. Both locknuts have been highly successful in offsetting vibration and shock. They have back of them Townsend's 135 years of experience in wire drawing and cold heading.

For information on how to save time, eliminate waste and produce better equipment with Townsend Locknuts, write for our locknut bulletin.

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COMPANY • ESTABLISHED 1816

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Cherry Rivet Company Division, Los Angeles, California

Sales Offices in Principal Cities

"Automatic" FIRE-FOG protection for large transformer room

UNINTERRUPTED POWER SERVICE . . .

an obligation to industry

Uninterrupted service is a cardinal principle in the furnishing of electrical power, an item of essential importance to the user. A transformer fire means more than the loss of electrical equipment and structures. Production losses from out-of-service time are non-replaceable.

Both utility companies and private users have for years been installing fire protection for key facilities. Through the relatively recent development of "Automatic" FIRE-FOG, the safe use of water for the extinguishment of electrical equipment fires, protection of large and small indoor and outdoor electrical installations is now practical from an economic point of view.

"Automatic" FIRE-FOG is specifically designed for your particular risk . . . electrically safe . . . approved by all leading insurance authorities.

We'll be glad to furnish engineering counsel on "Automatic" FIRE-FOG for your operations upon request . . . *no cost or obligation of course.*

"Automatic" FIRE-FOG
IT BLANKETS • IT ISOLATES • IT QUENCHES

. . . a famous member of the "Automatic" Sprinkler Family . . . provides basic fire protection for process equipment and storage in the chemical and petroleum industries. On-the-spot protection for quench tanks, dryers, explosive hazards, conveyor openings, air filters, oil filled electrical equipment and other units vital to production line operations.

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FIRST IN FIRE PROTECTION
DEVELOPMENT · ENGINEERING MANUFACTURE · INSTALLATION
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handling, wage incentives, maintenance and human relations. Copy may be secured for $3 from the society's headquarters at 35 E. Wacker Dr., Chicago, 1.

Perlite Materials Available

To meet the demand of our present defense requirements, and the ever heavier requirements yet to come, many vital materials are now, or will be soon, in critical short supply. Great Lakes Carbon Corp., miners and processors of perlite, have announced three unique new materials processed from perlite are immediately available in quantity as substitutes or supplements for certain of these critical short materials.

Properties of the processed products that make them so unique and adaptable are their small sealed voids which account for their extreme light weight and excellent insulating properties, their high surface area and irregular shape and their mild abrasiveness.

In many industries, the process products are now considered basic materials. Specially processed types are now sold in quantity to the industry for use in drilling and cementing oil wells. Usefulness of the new products in foundries has been satisfactorily demonstrated and further tests are now under way. Industries that are using critically short materials for fillers, extenders, insulants, refractories, fire retardants, abrasives, etc., may wish to study the use of these new products as substitutes or supplementary materials.

Metal Plastic Coated

A patent was issued recently covering the coating of metallic articles with vinyl plastisols. Patent No. 2,550,232, was issued to John W. Donnell and Kenneth Tator, and assigned to Industrial Lining Engineers Inc., Pittsburgh. A licensing arrangement will be made available to interested parties such as coaters of plating racks, tanks and other metallic articles used in the plating, chemical and other industries.

Two Metal Powder Standards

Two standards designed to aid both the metal powder producing and consuming industries as well as the metal powder parts user have just been released by the Metal Powder Association. One, 14-51T, specifies the preferred dimensions and tolerances of oil impregnated metal powder bearings; the other, 15-51T, describes a method for determining green strength of compacted metal powders.

What's your Reason for Switching to Bull Dog V-Belts?

We've got four good reasons why you should use Bull Dog V-Belts:

2

MINIMUM STRETCH

A new, exclusive technique gives you this advantage — resulting in fewer takeup adjustments, reduced slippage and extended life of the belt.

1

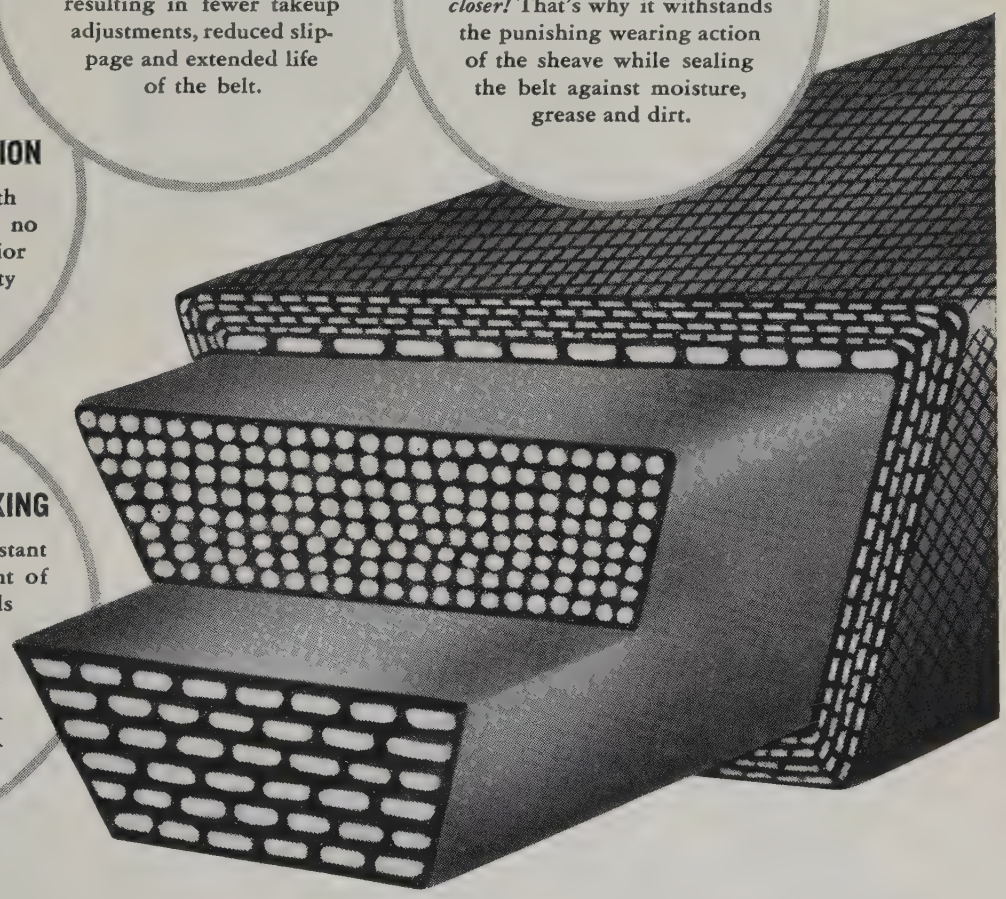
DURABLE COVERS

The weave of a Bull Dog's heavy, bias cut fabric *could hardly be any closer!* That's why it withstands the punishing wearing action of the sheave while sealing the belt against moisture, grease and dirt.

3

STRONG, SPECIALLY ENGINEERED CORD SECTION

Yes, the high tensile strength of the BWH Cord Section is no trade secret. Nor is its superior load carrying capacity, ability to absorb shock loads.



4

TAKES HEAVIEST FLEXING

The BWH policy of constant research in the development of quality-controlled compounds pays off! How? By producing compounds for your V-Belts that run cooler and DO NOT CRACK OR DETERIORATE UNDER SEVERE FLEXING.

These Bull Dog V-Belt product advantages mean steady, uninterrupted belt performance — more for your belt dollar — more for your power dollar. Perhaps *that's* why you have already decided to switch to Bull Dogs!

TOUGH PROBLEMS INVITED

Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting and hose problems. We're specialists in making mechanical rubber products work *better, longer.*

BWH DEPENDABLE RUGGEDNESS

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

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New Books

Learning to Weld

New Lessons in Arc Welding; simulated, gold embossed leather cover, 320 pages, 6 x 9 inches; published by Lincoln Electric Co., Cleveland, for $1.00 postpaid in the United States, $1.50 elsewhere; available from STEEL, Penton Bldg., Cleveland 13, O.

This book is based on lessons and instruction given at the Lincoln Arc Welding School. Lessons are practical, not theoretical, and fully cover basic fundametals of arc welding as well as more advanced welding in alloys, sheet metal and pipe. The basic 32 lessons cover welding mild steel in all positions and 29 advanced lessons cover other welding applications. Practice materials, exercises, questions and answers are given for each lesson.

Practical information in the 163-page welding application section will help welding operators advance in knowledge and skill after the fundamentals have been mastered. Latest welding procedures for faster and lowest cost welding, automatic a semiautomatic hidden arc weldi procedures, how metals are made a how to identify them, how to sele correct welding joints and how make common machine parts to u welding instead of casting are e plained.

Helps in Selecting Metals

The Behavior of Engineering M als, by H. W. Gillett; cloth, 395 pa 5½ x 9 inches; published by Jo Wiley & Sons Inc., New York, $6.50; available from STEEL, Pent Bldg., Cleveland 13, O.

The purpose of this book is to he those who are not metallurgists who participate in the selection metals and alloys for engineering u As it is intended to help in choosi suitable engineering materials, the b havior of these materials is discuss rather than the sometimes abstru theories that seek to explain their b havior. Technical terms are used little as possible and references ha been selected, where a choice existe for easy reading as well as for tec nical content.

Basic concepts of metallurgy a introduced in the first six chapters the book. Terms are introduced the natural sequence and examp show how they are used. The ne nine chapters deal with the behav of each of the principal commerc metals and alloys. Those materi of greater commercial importance discussed in more detail than the le commonly used materials. The maining chapters of the well-illu trated book are devoted to spec considerations that may influence t selection of metals and alloys. Th include such topics as machinabili special fabricating techniques, mea of using or selecting metals so as combat effects of corrosion wear a high temperatures; and some tric of the trade. In the final chap factors of cost and availability a discussed.

Ore Dressing Elements

Elements of Ore Dressing, by A thur F. Taggart, professor of mine engineering, School of Mines, Colu bia University; cloth, 595 pages, 6 9 inches; published by John Wiley Sons Inc., New York, for $10; ava able from STEEL, Penton Bldg., Cle land 13, O.

In this book the author selects fr ore dressing facts those that are n essary for engineering thinking the subject and to correlate them far as possible as an aid to memori tion. He presents the empirical gen alizations most commonly employ and explores, for the purposes of lustration, the ranges involved a

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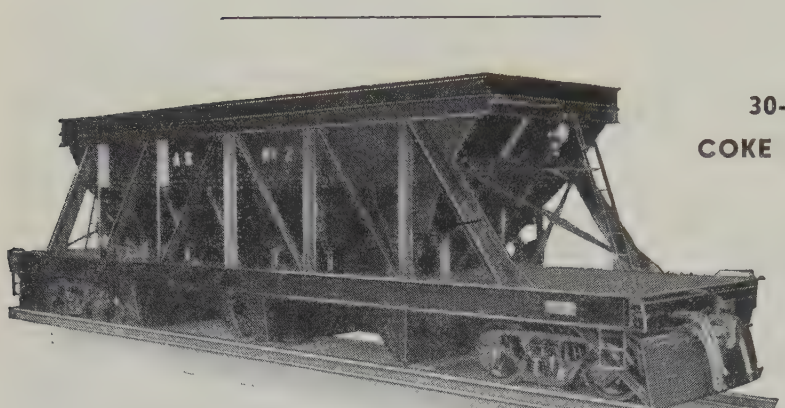

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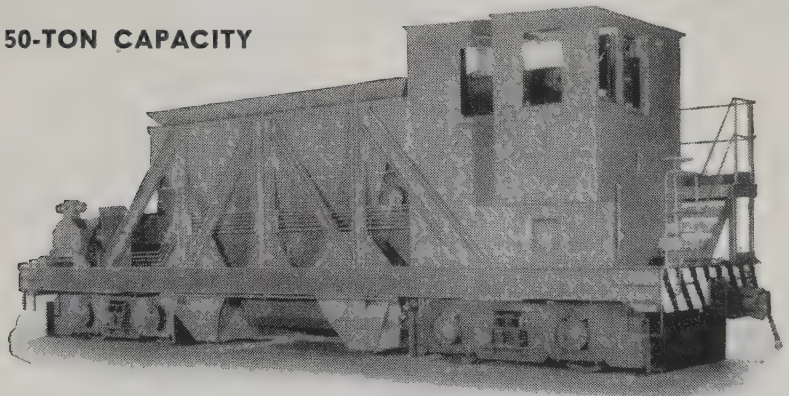

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Car has overhung operator's station to provide good line of vision. Car has air-operated discharge gates, air brakes and air-operated pusher arm. This is latched in the safety position and can not be lowered unless manually released. Hopper equipped with electric heaters. Centralized lubrication is provided, including main journals on trucks.

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the magnitudes of the safety factors that must be applied in use. Theories that have proved their worth in design and control of operations are presented and examined. Recent advances in operating techniques in fine crushing, grinding, dewatering and sink-float concentration are included.

Throughout the book emphasis is on the analysis of machines and processes and the identification of their elements with established scientific laws rather than on structural and operating detail. Through the newly adapted flowsheet form and method of flowsheet analysis which the new form facilitates, consideration of mills as process units is stressed. The philosophy that a mill and all its parts comprise a single treatment process is a continuing theme throughout the book.

Beginning with an informative chapter on what ore dressing is and does, the author then gives an explanation of hand picking, screening, filtration and electrical concentration. After introducing sedimentation, he takes up acceleration in free settling, hindered settling, sink float, jigging, film and trough cencentrators and shaking concentrators. A discussion of organic chemicals in flotation is followed by a detailed treatment of flotation. Final chapters deal with primary crushing, secondary crushing, grinding, transport and controls and flowsheets.

Better Materials Handling

Modern Methods of Materials Handling; cloth, 248 pages, 7½ x 11 inches; published by Prentice-Hall Inc., New York, for $5.50; available from STEEL, Penton Bldg., Cleveland 13. O.

Edited by the Material Handling Institute, the purpose of this book is to provide a broader basic knowledge to men in the materials handling division of industry. In the introduction, "An Approach to the Problem", how to decide on what type of equipment to use is discussed. Factors involved in developing new cost data for materials handling are also discussed. How a flow analysis chart and diagram can aid in obtaining more efficient handling operations is explained.

The well-illustrated book describes methods, types of equipment and materials in actual use. Use of materials handling equipment in these industries are described and illustrated: Aircraft, automotive, beverages, building material, drugs and chemicals, electrical, food products, foundry, glass, leather, metal products, oil and paint, paper products, printing and publishing, railroads, textiles, tire and

ber, warehousing. Problems of par-ular companies are given with the ution that was found by more ef-ient use of materials handling uipment.

Modern Process Operations

Unit Operations, by George Granger own and associates; cloth, 611 ges, 8 x 11 inches; published by hn Wiley & Sons Inc., New York, r $7.50; available from STEEL, Pen-n Bldg., Cleveland 13, O.

The textbook presents a compre-nsive treatment of modern process erations and stresses the similarity their basic principles. Modern prac-e and equipment are emphasized well as mathematical interpreta-ons. The object is to build the stu-nt's knowledge and power progres-ively and continuously until he has reasonably clear concept of how to pproach the problems of design and peration of processing equipment. nit operations are grouped accord-g to similarities in action or in ethods of calculation and presented sequence according to increasing fficulty.

After an introduction to unit op-rations, the contents are divided into ree parts: Solids, fluids, separation y mass transfer—the ideal stage oncept.

Throughout the book the inductive ethod is generally followed relying pon observations from experience ather than upon deductive rational-zations. Kinetic explanations receive creasing emphasis in the last part f the book. Physics, calculus and a eginning course in material and en-rgy balances or thermodynamics are ssumed as prerequisites to unit oper-tions.

Mr. Brown, the author, is the Ed-ard DeMille Campbell university rofessor of chemical engineering and hairman of the department of chem-cal and metallurgical engineering at University of Michigan. His associates re Alan Shivers Foust, Donald La-Verne Katz, Richard Schneidewind, Robert Roy White, William Platt Wood, George Martin Brown, Lloyd Earl Brownell, Joseph J. Martin, George Brymer Williams, Julius Thomas Banchero, Jesse Louis York.

Assembly Suggestions

To help industry meet urgent de-ense production needs, Shakeproof nc., a division of Illinois Tool Works, Chicago, offers a 24-page booklet en-itled "Assembly Suggestions." Speci-lly prepared to assist designers and roduct engineers in the selection of astenings best suited for specific re-uirements, it contains details of the ewest fastening developments.

Faster production in forging or cold coining operations, using less skilled labor yet holding ever closer tolerances in output—that's what manufacturers for defense or civilian needs are demanding today. Clearing meets those demands —all of them—with its new Series EF presses, which incorporate many improvements over previous Clearing forging presses.

Short-travel disc clutch and brake act faster to speed operation. Offset eccentric allows continuous guiding of extra long slide to assure maximum precision. Coordinated knock-outs minimize contact time to keep dies cooler, longer lasting.

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CALENDAR OF MEETINGS

† Denotes first listing in this column.

July 23-27, American Association for the Advancement of Science: Annual Gordon Research Conference on Corrosion, New London, N. H. Conference director's address: Dr. W. George Parks, Rhode Island State University, Providence, R. I.

July 30-Aug. 2, American Electroplaters' Society: Annual convention, Statler Hotel, Buffalo, Society address: P.O. Box 168, Jenkintown, Pa.

August 20-23, American Institute of Electrical Engineers: Pacific general meeting, Multnomah Hotel, Portland, Oreg. Institute address: 33 W 39th St. New York 18.

August 20-23, National Association of Power Engineers Inc.: Annual meeting and exhibit, Hotel Plaza, San Antonio, Tex. Association address: 176 W. Adams St., Chicago 3.

Drills 24-Inch Holes

A specially developed series of Warner Electric clutches and brakes has been installed on the world's largest milling machine designed and manufactured by Ingersoll Milling Machine Co. Weighing approximately one million pounds, it can drill holes 2 feet in diameter in most types of metal, in addition to performing the normal milling operations.

Due to the tremendous weight and size of this machine, accurate positioning of the cutting tools was difficult to achieve. In moving the machine into position to complete the machining operation, split second stopping and starting were necessary.

In order to accomplish the accurate positioning and still maintain an efficient productive operating speed, electric clutches, brakes and associated high speed controls were specified.

Electric brakes and clutches are mounted principally on those parts of the machine which move up and down or from side to side. These moving parts contain the special cutting tools which machine metal.

The milling machine with its simplified electric control system can be operated by one man. Actual operation is done by means of a pushbutton panel board, giving the operator overall visibility of the working surface and increasing the safety factor.

Bus Duct Manual Offered

A new 68-page manual describing types of bus duct and accessories available, and presenting application and test data, specifications, information on pricing a typical bus duct installation, and a typical bill of materials, is available from Westinghouse Electric Corp., Pittsburgh, by writing for it on your company letterhead.

RF INDUCTION HEATING...

Now even better than before

SURE – Miehle Printing Press and Manufacturing Company has been using induction heating on about 100 parts for years. They therefore know that for control, for quality, for savings in labor, floor space, and other costs (and for production increases) induction heating can't be beat.

AND – With this experience in mind, Miehle asked about new RF equipment to replace their old induction heating set-up.

THEN – Miehle purchased a Westinghouse 20 KW-450 KC RF Generator. It's used for brazing, hardening and annealing of printing press parts in job-lots. RESULTS: Production up more than 20%, costs cut accordingly (over the former equipment which had already shown clear gains over other methods!).

You, too, can save space, time, and money with Westinghouse RF heating equipment. Write today to Westinghouse Electric Corporation, 2519 Wilkens Avenue, Baltimore 3, Maryland. Outline your specific needs.

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That's right. Not only does Alliance build the world's most efficient cranes . . . Alliance builds the biggest!

Cranes for hot metals, raw materials, finished products . . . Alliance builds them all.

Alliance cranes are safer, easier and more economical to operate and they're always built for your specific requirements.

United States Steel, for example, will use a special twenty-four wheel Alliance Open Hearth Crane in their new Fairless Works at Morrisville, Pa.

This 400 "tonner" will be **the biggest Open Hearth Ladle Crane in the world**—engineered to perfection so the load is always distributed equally, each wheel taking a proportional share of the load.

Alliance experience covers a wide range of industries. This year we are celebrating our Fiftieth Anniversary serving the steel industry throughout the world.

Alliance engineers will be happy to discuss ways to give your plant extra lifting power for the days ahead. Write for a consultation.

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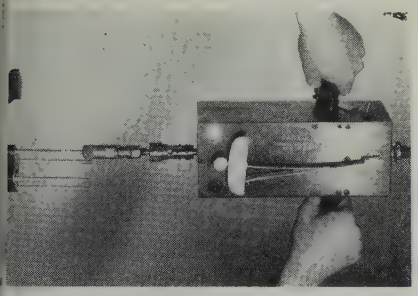
Garvin torque indicating driver ade by Tru-Circle Products Co., O. Box 536, South Bend, Ind., sitively and automatically measures e torque as it drives studs, nuts, rews or fasteners. Stud breakage d scrap loss are reduced and man- ower is not wasted on hand-torquing spection.

Unit is built around a standard flection-type torque wrench with inimum and maximum torque in- cated by the wrench and indicating



ghts. Green light is used for mini- ium torque and red light for maxi- ium torque. Driver is made in 0- 00, 0-350, 0-500, 0-750, 0-1500 and -2000 inch-pound capacities. The nallest model is portable and the rger units are mounted on radial rill press type arms.

heck No. 1 on Reply Card for more Details

ual Purpose Assembler

Either three or four different sizes f cam shaft bushings can be as- embled into four or six cylinder die- el engine blocks weighing up to 950 ounds in one operation on a press ade by Oilgear Co., 1560 W. Pierce t., Milwaukee 4, Wis. Features of he press are: Semiautomatic, inter- ocked, electric-hydraulic control; al- ernative manual pushbutton control, ariable pressing and return speeds, ydraulic elevator; positive block lo- ation; dual purpose horn; reduction f operator's work to slipping split ushings on pins, keeper rings on ushings and guiding block to assem- ling position.

With selector switch at "auto" emiautomatic operation is started y depressing dual safety pushbut- ons. Until bushings are in place and lock is in approximate assembling osition elevator will not raise block r operate ram. When block is in osition the hydraulic elevator raises lock, locates pan rail surface over owel pins and holds block in assem- ling position, main ram pulls bush- ngs home in block a preset distance, pressure reverses cycle to first return main ram and then lower elevator to unloading position. Block is then pushed onto conveyor and another block is moved into press.

Check No. 2 on Reply Card for more Details

Turret Bearings Redesigned

Redesign of bearings in the Lign-o-matic turret made by Howe and Fant Inc., 531 Flaxhill Rd., South Norwalk, Conn., gives longer life and precision. Bearings permit the spindles to move laterally and angularly as well as to rotate. When drilling machine spindle is lowered, tapered surface of a driver engages the mating tapered surface of a turret spindle. Bearing construction allows turret spindle to be moved into exact alignment with the drilling machine spindle. The turret spindle is locked in position and cannot get out of alignment during the drilling operation.

Overall runout is reduced to less than 0.0001-inch. Hollow spindles reduce weight and permit sustained accuracy at high operating speeds.

Check No. 3 on Reply Card for more Details

Maintenance Minimized

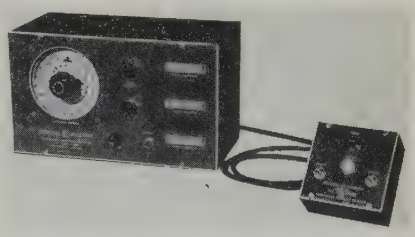
Heavy box type 4-way bed horizontal boring, milling and drilling machine made by Bullard Co., Bridgeport 2, Conn., is built in 4 or 5-inch spindle sizes. Bed supports equally on its four ways a heavy ribbed box type saddle and table. Bed ways are covered by stationary sheet metal guards as a protection from chips and other foreign materials. Nonmetallic bearing surfaces are used under both saddle and table to provide long wearing replaceable bearing surfaces. Saddle guide and feed screw, located between inner bed ways, minimize any cocking tendency due to uneven load distribution. Single lever, self-equalizing clamps acting on the outside of the outer bed ways give maximum hold-down effect.

An improved type of hydro-dynamic coupling and brake motor, driving through multiple v-belt, gives smooth, positive acceleration and stops as well as absorbing shock induced by interrupted cuts in heavy work. The 4-inch spindle machine has a range of 24 speeds from 8 to 1000 rpm while the 5-inch size has 24 speeds from 7 to 850 rpm.

Check No. 4 on Reply Card for more Details

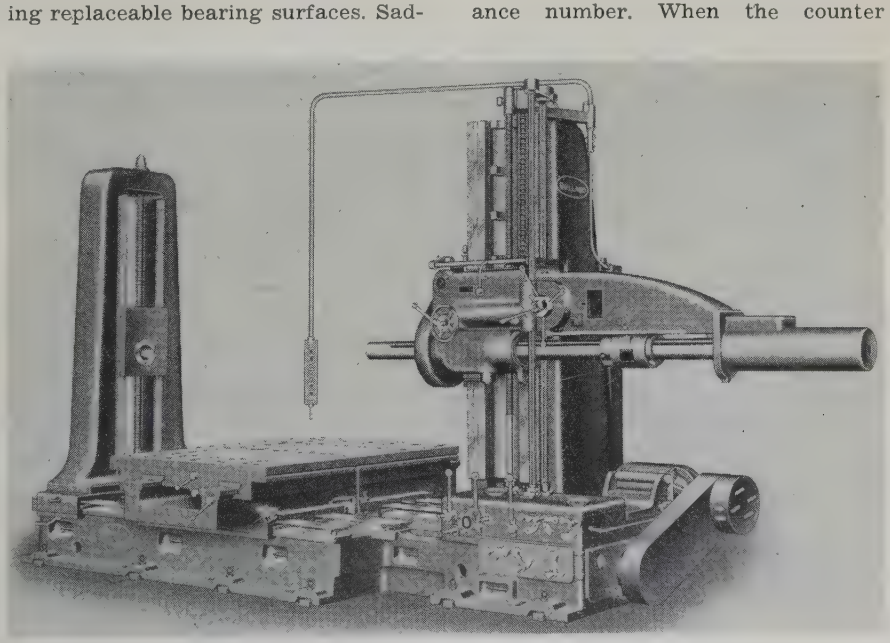
Quality Control Aid

An electrical device for automatically keeping track of the sampling procedure in quality control is announced by the Special Products Division, General Electric Co., Schenectady 5, N. Y. The monitor is designed to eliminate the complexity

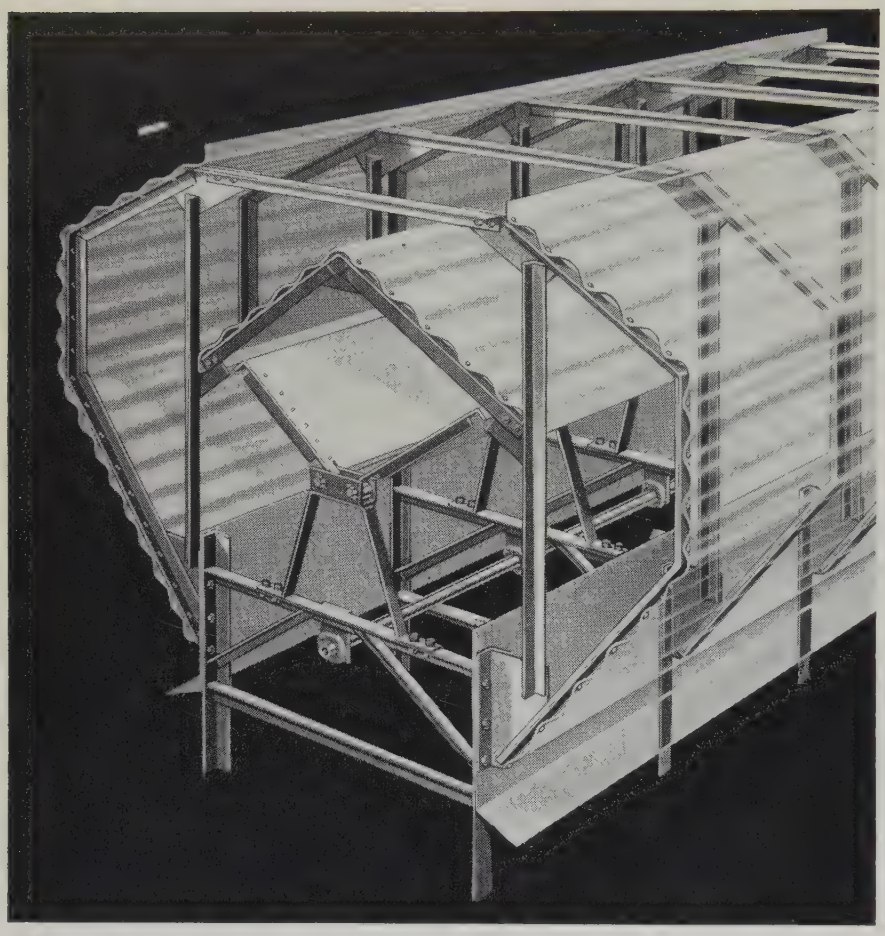


of paper work that is inherent in continuous sampling methods of quality control.

An electric counter set to any predetermined number from 1 to 400 automatically keeps track of the clearance number. When the counter



WHEN LABOR SLOWS DOWN



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Heat, smoke and fumes can be replaced by fresh, live air economically with the Burt Monovent Continuous Ridge Ventilator. Installed on any type roof, it functions as a giant exhaust valve along the entire length of the structure. A complete range of sizes from 4″ to 96″ handles almost any application.

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reaches the set number, contact is broken and the white sampling light goes on indicating that the predetermined number of acceptable units has been inspected and that sampling can resume. Percentage inspection or sampling may vary from 1 per cent to 50 per cent, depending on the desired average outgoing quality of level (AOQL). Unit requires 110 v and has a maximum counting speed of 500 units per minute.

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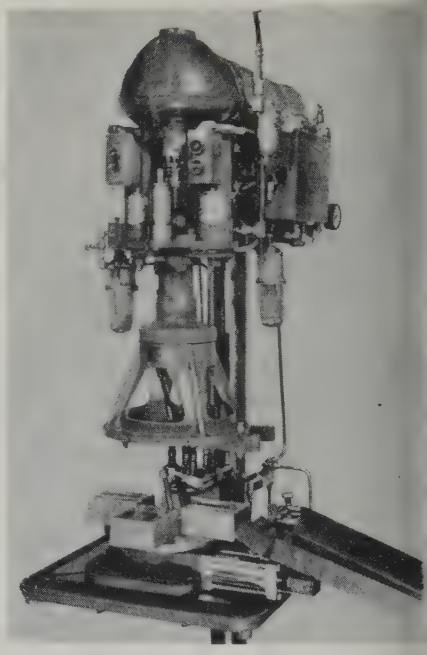
Air-Controlled Drilling

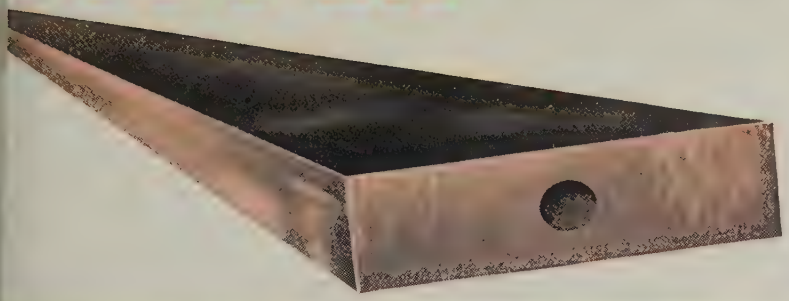
Beckett-Harcum Co., 1140 Wayne Rd., Wilmington, O., is manufacturing high production tapping and drilling



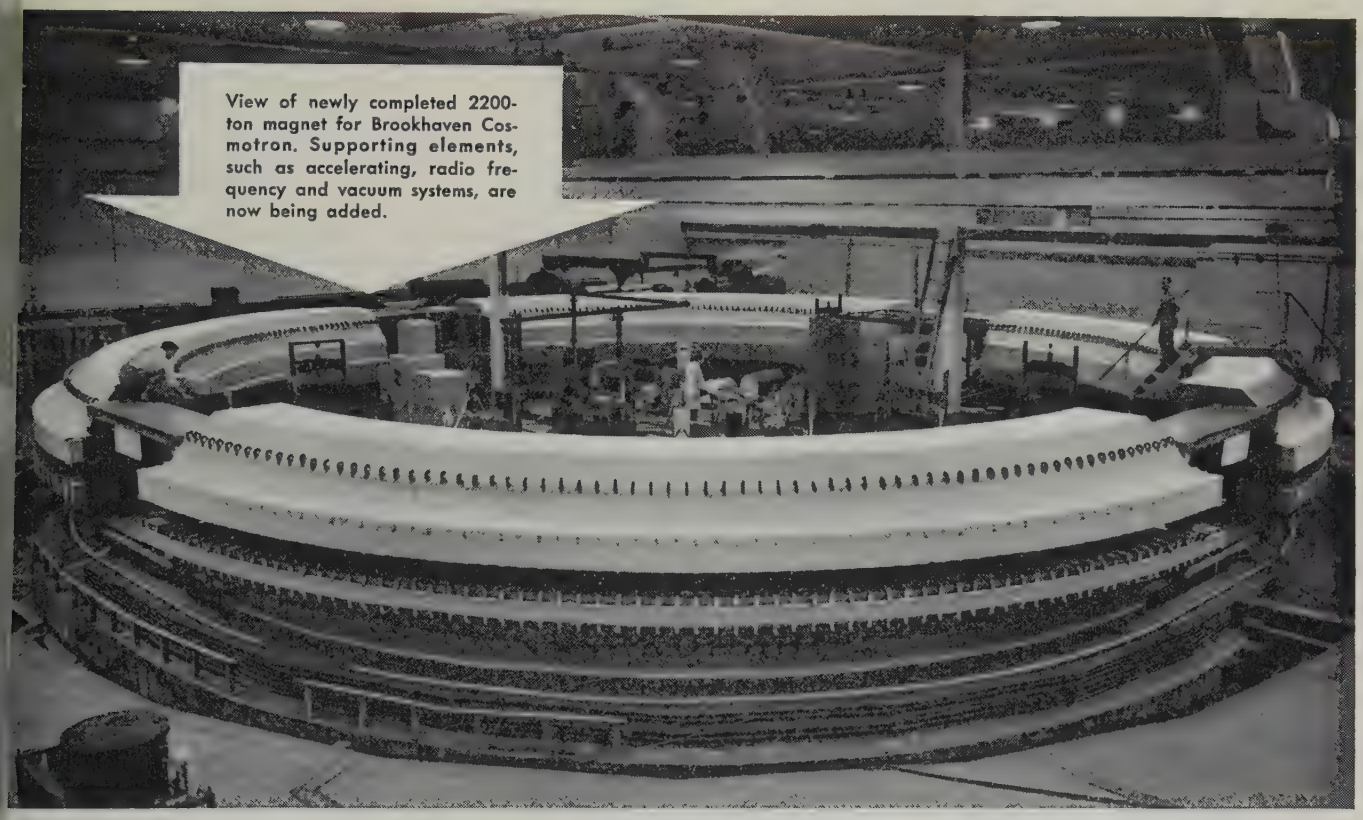
machines that can be equipped with automatic, air-controlled multiple spindle heads and index tables. Multiple tapping can be performed from a multiple drill head without lead screws or clutches. Very light air pressure permits the taps to provide their own lead, no forcing of the tap or galling action results. Class 2 and 3 fits can be obtained in metals as soft as magnesium as well as in stainless and chrome molybdenum steels.

Multiple tapping is accomplished with a special high reversal motor which reverses the taps when they reach desired depth. By reversing the motor, taps lead out without stripping the last thread even in extruded holes in very soft metals. Motor is capable of a complete cycle every three seconds. By switching out the motor reversing control, drilling operations can be performed and the same fixtures used for drilling may be used for tapping by removing the drill bushings. In drilling operation any desired

COPPER—most useful metal known to man



End section of AnacondA soft annealed copper bar used as magnet winding for new Brookhaven Cosmotron. Bars were produced in cross sections of 2.182" x .750" and 1.875" x .750" in lengths up to 52'-6" and 47'-8" respectively.



View of newly completed 2200-ton magnet for Brookhaven Cosmotron. Supporting elements, such as accelerating, radio frequency and vacuum systems, are now being added.

. . . to discipline a cosmic ray

At Brookhaven National Laboratory on Long Island, N. Y., devoted to fundamental study of nuclear forces and development of uses of atomic energy, the world's newest and largest atomic accelerator has just passed preliminary tests of its giant magnet.

Known as the Cosmotron, its job will be to help understand the origin of the nuclear forces which are responsible for atomic energy. The Cosmotron — so named because it will be used to produce artificial cosmic rays—is designed to speed protons to an energy exceeding two billion electron volts, or five times that of the most powerful existing accelerators.

Holding these particles in their precise path is accomplished by a giant magnet with windings made of 23,000 feet of high conductivity, soft annealed copper bar with a uniform hole slightly less than 3/8" diameter throughout the entire length to carry cooling water. One hundred and fifty thousand pounds of these bars, in two sizes of cross section and in lengths up to 52'-6", were extruded on a 2500-ton press at the Buffalo Branch of The American Brass Company.

We don't anticipate receiving many orders for cosmotron magnet windings. But we think the technical problems of this project indicate the breadth of service Anaconda offers to Industry. The experience and help of Anaconda's Technical Department are always freely available to you wherever copper and its alloys are involved. Just write to The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 51104

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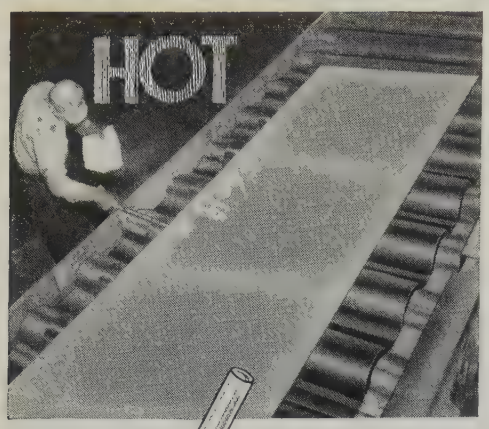
Says Steel Man



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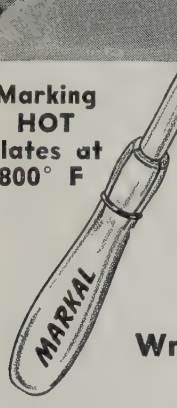

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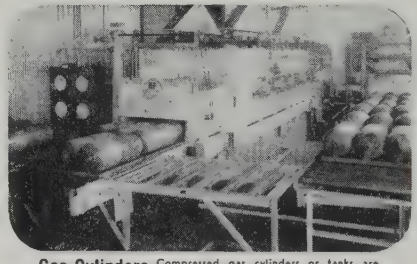

Gas Cylinders Compressed gas cylinders or tanks are continuously normalized and annealed—scale-free, inside and out—in this and other EF gas fired furnaces.

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We have the drawings and have already built these and many other defense production furnaces. Years of experience and complete manufacturing facilities enable us to give dependable service on furnaces for treating jet or propeller type engine parts; tank, automotive or aircraft parts; armor plate; metal powder products, ammunition components and other defense products.

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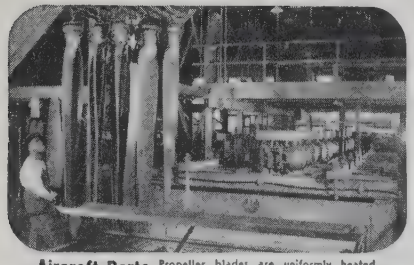
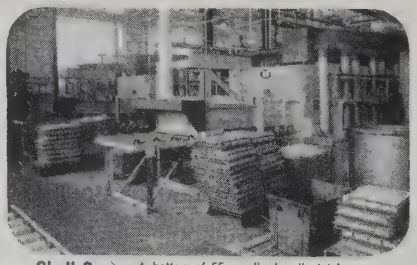


Aircraft Parts Propeller blades are uniformly heated and quenched in this EF continuous furnace. Types available for other propeller and jet type engine and aircraft parts.



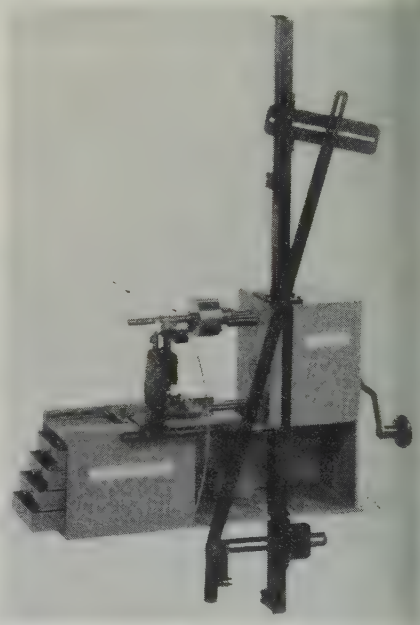
Shell Cases A battery of EF gas fired radiant tube continuous special atmosphere, clean annealing and stress relieving furnaces. Other types available for steel or brass.

air pressure can be obtained up to 1250 pounds using a 100-pound air line.

Check No. 6 on Reply Card for more Details

Hand-Operated Spring Coiler

A hand-operated spring coiling machine is available from Carlson Co., 277 Broadway, New York 7, N. Y., for making compression, extension and torsion springs. Coiler No. 2 supplements and doubles the capacity of an earlier and smaller model No 1. It is useful for making experimental or sample springs and for short production runs up to about 500 pieces, as the setup time is short and the output is up to 300 precision springs per hour.

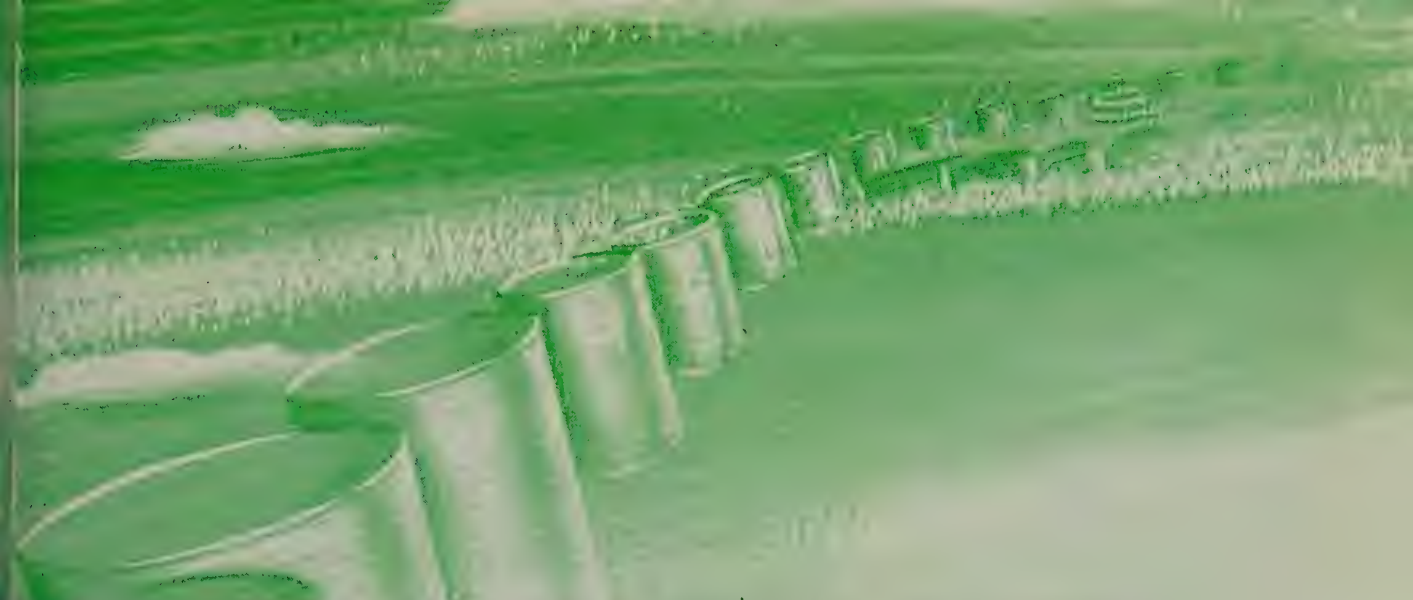


Compression springs can be wound up to 8 inches long with any number of coils up to 30, to any pitch up to 1 inch and with end coils closed or squared automatically on both ends. Extension and torsion springs can be wound tight or loose up to 8 inches long either left or right hand, up to 150 coils with extended arms on both ends up to 5 inches long. Outside diameters up to 2 inches and wire diameter from 0.041-inch to 0.156-inch can be coiled.

Check No. 7 on Reply Card for more Details

Tapper Sensitivity

High speed sensitive tapping machine is a development of Ettco Tool Co., 594 Johnson Ave., Brooklyn 6, N. Y. Machine is built for either single spindle tapping units or multiple heads with provision for quick changeover. A feature of the machine is that no skill or delicate touch is required. Tapping action is con-



NEW WEIRTON TINPLATING PROCESS

Saves 25% to 50% tin!

RELEASES CRITICAL METAL FOR MILITARY USES

An entirely new and revolutionary electro-tinplating process recently perfected by Weirton Steel Company results in new savings in tin amounting to as much as 50 per cent over previous quantities used.

Individual sheets of steel destined for tin can fabrication are plated on one side with an amount of tin necessary to protect the ultimate contents of the can, and on the other side with only the amount of tin necessary to protect the outside of the can from exposure. A new data sheet reveals the immensity of the savings in this critical metal.

Weirton's new development can well prove to be a two-edged sword in national defense; it will not only result in tremendous savings of pig tin for military purposes but will at the same time increase the production of tinplate for vital food packing and container industries.

NEW ELECTROLYTIC TIN COATING DATA SHEET OF WEIRTON STEEL COMPANY

.25# Basis One Side .50# Basis Reverse Side	In Lieu of .50# Basis Both Sides
Average Coating	.375#
Metal Savings Per Base Box	.125#
Metal Savings—Per Cent	25.0%
Increase in Area	33.3%

.25# Basis One Side 1.00# Basis Reverse Side	In Lieu of 1.25# Basis Both Sides
Average Coating	.625#
Metal Savings Per Base Box	.625#
Metal Savings—Per Cent	50.0%
Increase in Area	100.0%

.50# Basis One Side 1.00# Basis Reverse Side	In Lieu of 1.25# Basis Both Sides
Average Coating	.750#
Metal Savings Per Base Box	.500#
Metal Savings—Per Cent	40.0%
Increase in Area	66.7%

.25# Basis One Side .75# Basis Reverse Side	In Lieu of .75# Basis Both Sides
Average Coating	.500#
Metal Savings Per Base Box	.250#
Metal Savings—Per Cent	33.3%
Increase in Area	50.0%

.375# Basis One Side 1.00# Basis Reverse Side	In Lieu of 1.25# Basis Both Sides
Average Coating	.6875#
Metal Savings Per Base Box	.5625#
Metal Savings—Per Cent	45.0%
Increase in Area	81.8%

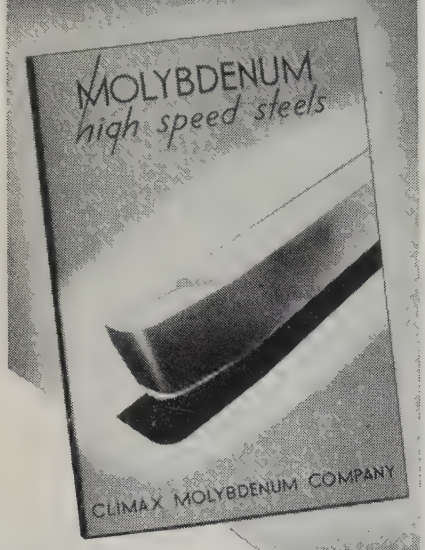
.50# Basis One Side .75# Basis Reverse Side	In Lieu of .75# Base Both Sides
Average Coating	.625#
Metal Savings Per Base Box	.125#
Metal Savings—Per Cent	16.7%
Increase in Area	20.0%

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

It's easy to learn to treat Molybdenum High Speed Steel



FREE—this booklet gives all the facts

Data on performance, heat treatment and other authoritative facts are available in our booklet "Molybdenum High Speed Steels".

More and more high speed steel will be of the Molybdenum types which are already giving performance equal to or better than tungsten steel, with economy in alloy content.

Climax Molybdenum Company
500 Fifth Avenue · New York City

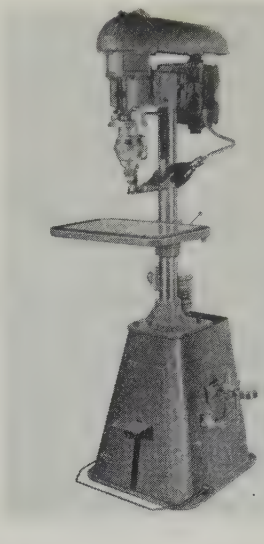
Please send your FREE BOOKLET
"MOLYBDENUM HIGH SPEED STEELS"

Name .....
Position .....
Company .....
Address .....

S-7 HS-7

trolled through an adjustable pull spring inside the centerless ground column. Whenever the foot treadle is pressed down by foot or air, the spring feeds the tap into work and gives automatic protection against tap breakage or faulty threads.

Two oil tanks are built in the machine. One in the head supplies gravity fed oil for light lubrication and the other in base is for use with



an oil pump when a steady flow of oil is required. Built-in stripper plate permits use of simple work holders and is used to strip part from tap. It also holds lubrication tube and brush.

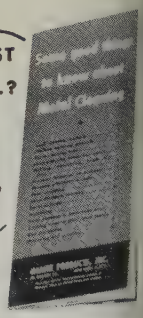
Torque Converter for Tractor

A 12,000 pound drawbar pull tractor with torque converter is being manufactured by Buda Co., Harvey, Ill. Model HA-120 tractor with a single stage, closed circuit type torque converter eliminates shock and

strain and smoothly applies maximum power even when starting under full load conditions.

Unit is powered with a 6 cylinder, 230 cubic inch displacement gasoline engine but a diesel engine of the same displacement and interchangeable mounting dimensions can be supplied. Tractor has four-wheel hydraulic brakes, heavy duty transmis-

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9



This FREE booklet on Metal Cleaning helps you get better production, larger profits. Among its subjects are:

Machine cleaning	Tank cleaning
Electrocleaning	Pickling
Pre-paint treatment	Burnishing
Steam-gun cleaning	Rust prevention

FREE Write Oakite Products, Inc., 34E Thames St., New York 6, N. Y., for the 44-page booklet: *"Some good things to know about Metal Cleaning."*

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE

WHAT'S THE BEST WAY TO STRIP PAINT FROM METAL PARTS TOO LARGE TO BE SOAKED IN TANKS?
See page 3

This FREE booklet on Paint Stripping helps you plan better procedures. Read more about:

¶How to strip large areas of structural metal? *See page 5.*

¶How to strip metal parts in large volume? *See page 9.*

¶How to strip oil-base paints? synthetic enamels? lacquers? alkyds? phenolics? ureas? *See page 12.*

FREE Write Oakite Products, Inc., 34E Thames St., New York 6, N. Y., for this 14-page booklet: *"How to Strip Paint."*

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

Molding Machines

New Bulletin describes SPO line of Jolt Pin Lifters

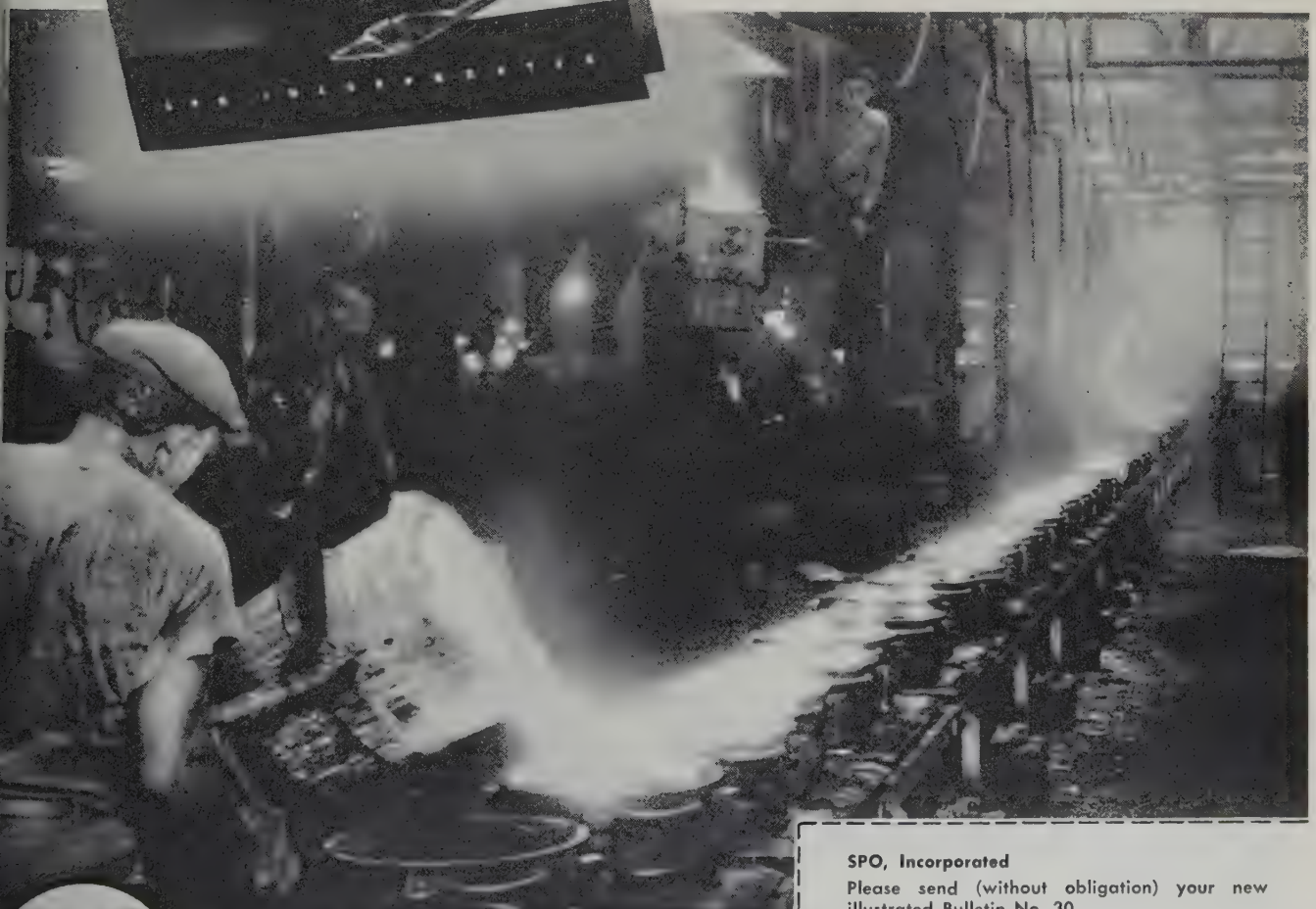
Complete data on the Series 3000 high-production jolt pin lifters are presented in this new illustrated catalog which is available to foundry management and purchasing personnel such as superintendents, foremen, production expediters, etc. Designed for maximum speed, safety and ease of operation, these machines feature the patented SPO "inverted jolt" mechanism.

The jolt pin lifters described in this publication have jolt capacities ranging from 750 to 4000 pounds and are fully adjustable to meet diversified production demands. Pivot type adjustable lifting pins will accommodate any type or size of flask within their capacities. Both breakaway and secondary draw speeds can be adjusted to different job requirements, and jolt impact intensity of each machine is variable.

In this catalog, dimensions, capacities, pattern draw, SPO vibrator size and other pertinent data are tabulated for quick reference. Photographs and line drawings depict the construction and features of the various machines.

Bulletin No. 30 will be sent upon receipt of coupon or letterhead request.

129-SI



SPO INCORPORATED

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SPO, Incorporated

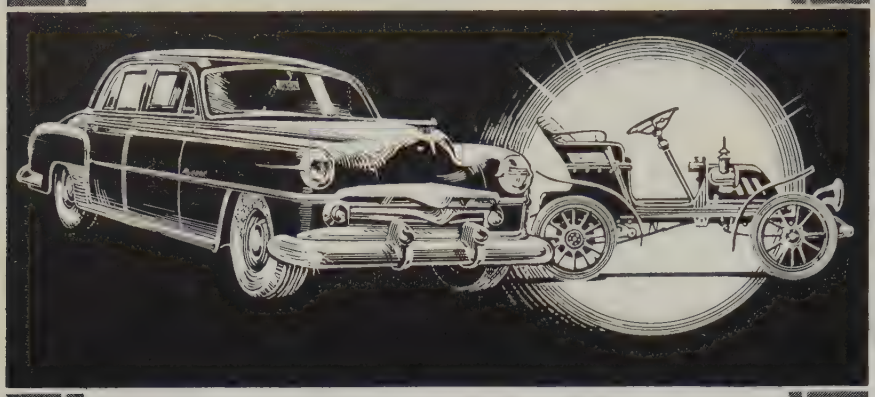
Please send (without obligation) your new illustrated Bulletin No. 30.

Name_____

Address_____

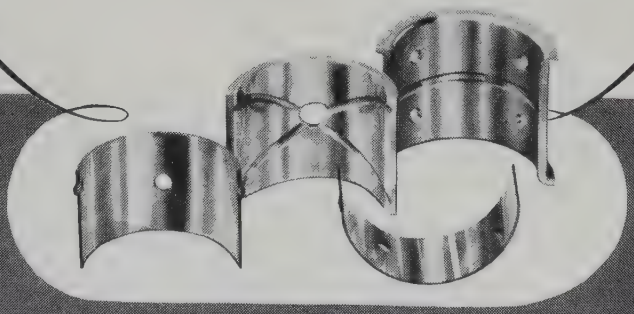
Town_____ State_____

JOHNSON BEARINGS
1901-1951



We grew up with the Automobile Industry

GROWING UP together, working together for the past fifty years, the automobile builders and Johnson Bronze have made tremendous progress. Engineering cooperation made possible higher compression, higher speeds, and greater durability in automobiles. Such cooperation in many industries has been responsible for new bearing developments—changes in bearing design, new conceptions of precision, refinement of alloys, and new bearing metals. As a result, today's Johnson Sleeve Bearings are the most accurate and the best we have ever produced. The line is complete . . . cast bronze, babbitt lined bronze, babbitt-on-steel, bronze-on-steel, powder metallurgy, and aluminum alloy. We will gladly study your requirements and make recommendations on types and designs of bearings needed. Write today.



SLEEVE BEARING HEADQUARTERS Since 1901

Johnson Bronze

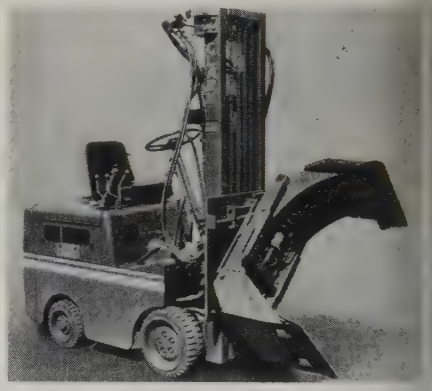
550 SOUTH MILL STREET · NEW CASTLE, PA.

sion with four forward and one reverse speed, an adjustable seat and a 17-gallon Protectoseal fuel tank.

Check No. 9 on Reply Card for more Details

Rotating Clamp Added

Rotating roll clamp designed for attachment to fork trucks of 2000-pound capacity is announced by Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich. It is designed to handle rolls of not over 1500 pounds on 2024 models and of not over 950 pounds on 2015 models. Unit can be rotated through 90 degrees so that roll can be picked up from horizontal position and stood on end, or vice versa. It is rotated by a cylinder with chain and sprocket linkage and is provided with positive



stops at vertical and horizontal positions to eliminate excessive strains on chain.

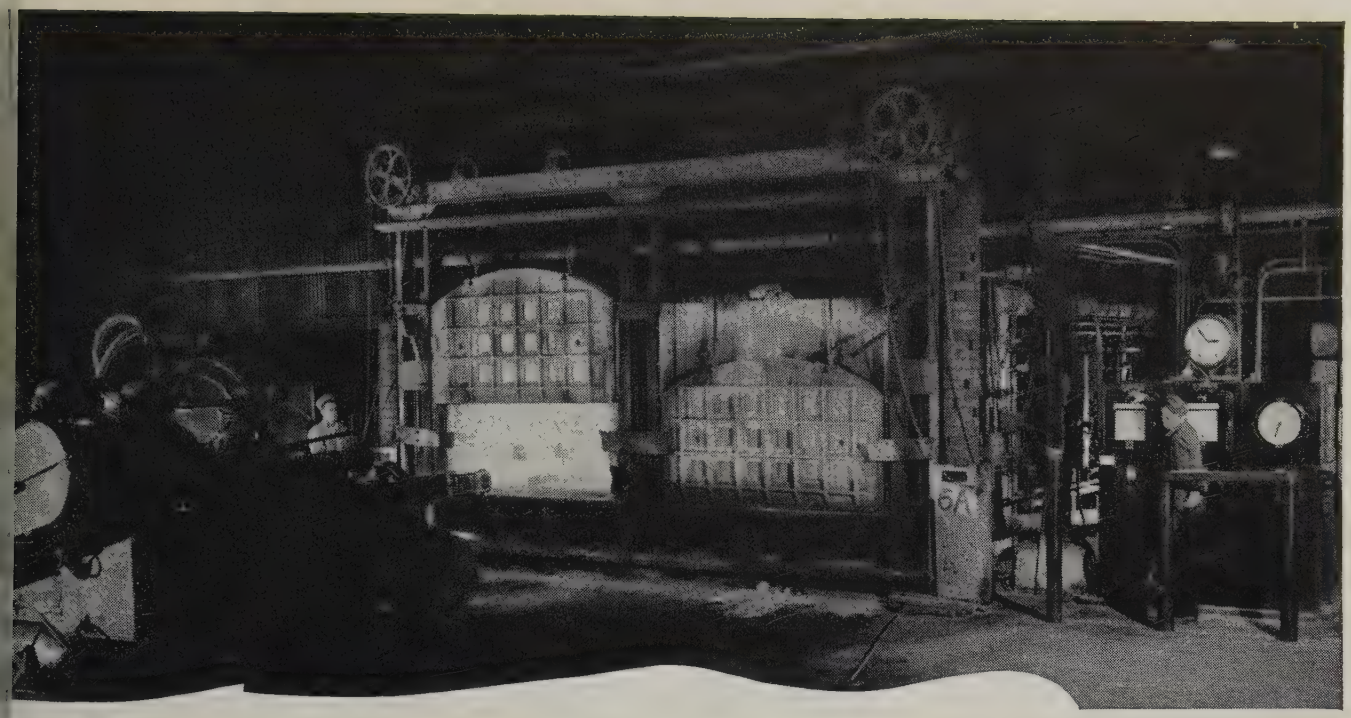
One clamp arm is rigidly mounted and when rotated is always in bottom position for handling horizontal rolls. Second clamp arm is hydraulically actuated and provides a maximum clamping force of 5000 pounds. Clamp pads are hinge-mounted to fit against the roll and exert maximum pressure over the entire surface. Manually operated relief valve permits adjustment of hydraulic pressures to suit rolls varying as to size and weight.

Check No. 10 on Reply Card for more Details

Sensitive Oscillograph

Series ES-500A cathode ray oscillograph is introduced by Precision Apparatus Co. Inc., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y. It has an extended range push-pull vertical amplifier with response beyond 1 mc, 2 megohm input resistance, approximately 20 mmfd input capacity and voltage is regulated for utmost stability.

Better than 20 millivolts per inch vertical amplifier sensitivity permits direct alignment and adjustment of low gain circuits and examination of minute signal levels. Unit has a cali-



This New Controller Says "Hurry Up, Furnace!"

WITH production reaching toward all-time highs, this new P.A.T. 50 Control already is helping many key plants increase the output of their furnaces. Here's why:

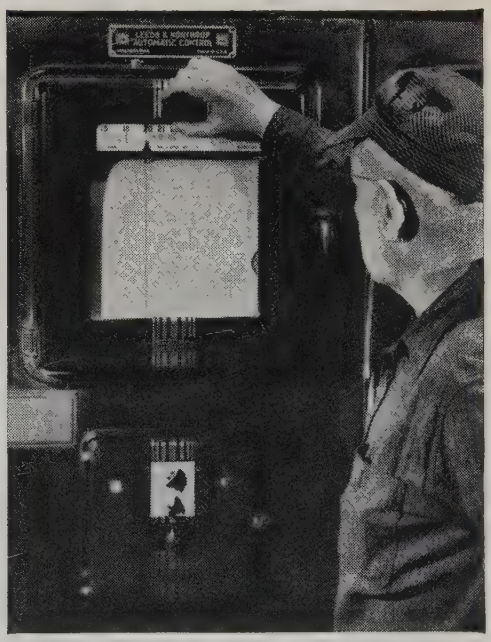
This Control has something that's brand new in proportional, electric controllers. Called "rate action," this feature enables the Controller to act on the *speed* of swings in furnace load, as well as on their size and on the length of time they persist. Thus, if temperature changes gently, it is gently nudged back into line. But if it starts off vigorously—as when the furnace door is opened—P.A.T. 50 reacts vigorously. Then, when the change has been headed off, the Controller starts to back away. But "putting on the brakes" it brings temperature in line smoothly and rapidly.

Thus, "Rate Action" increases production because it reduces the length of time a furnace is off temperature.

Also, Proportioning and Reset Actions are more responsive than before. These two components stop the normal temperature swings which are started by changes in the size and permanence of the furnace load. Even without rate action, these increases would enable P.A.T. 50 to do a better-than-ever job. With rate action, results are superior to any previous electric control.

The News is in the Control Unit at bottom of panel shown at right. Earlier installations can be converted to P.A.T. 50 by replacing the Unit and making slight changes in the Controller.

For details, contact our nearest office, or write us at 4957 Stenton Ave., Philadelphia 44, Pa.



THESE furnaces and controllers are part of the slab-heating equipment with which The Timken Roller Bearing Company, Canton, O., conditions high-alloy steels for rolling. The Timken Company has used many earlier L&N Controllers. They find P.A.T. 50 is a further step forward, not only in guarding quality, but also in increasing production by shortening the off-temperature time.

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

Trl. Ad ND4-660(1)

brated, frequency compensated, wide band V input step-attenuator. Extended range, push-pull horizontal amplifier gives response beyond 1 mc. Input resistance is ½-megohm and input capacity is approximately 20 mmfd. Multi-vibrator type internal linear sweep circuit affords direct coverage from 10 cycles to 30 kc. A vertical phase-reversing switch permits inversion of test patterns.

Check No. 11 on Reply Card for more Details

Tapping Attachment

Lead screw tapping attachment offered by Automatic Methods Inc., Newark, N. J., is a support arm attachment for any standard drill press. Utilizing the Jacob Rubberflex collet, taps of all standard sizes ranging from 0 to ¼-inch may be used without changing the collet. The unit is available to fit 14 and 15-inch drill presses.

Check No. 12 on Reply Card for more Details

Patented Spindle Nose

An advantage of the patented Thread-Lock spindle nose, introduced by Wade Tool Co., Waltham, Mass., is that the chuck is located and locked with one half turn of the locking ring. The American standard taper D1-3 is used in conjunction with the company's Thread-Lock principle.

Check No. 13 on Reply Card for more Details

Electrical Control Device

Sensivolt, developed by Sola Electric Co., Chicago, Ill., controls electrical machinery by reacting to very slight changes in the voltage of alternating current. With this device it is possible to have a static alternating current voltage sensitive control capable of differentiating small changes in alternating current voltage and handling large amounts of power.

Check No. 14 on Reply Card for more Details

Heat Resistant Paint

M-aluminum, a new heat resistant paint for moderately high temperatures (200 to 700° F) is available from Speco Inc., Cleveland 9, O. It is suitable for both interior and exterior use and brush or spray application.

Check No. 15 on Reply Card for more Details

Tool Blocks

Rotangular tool blocks, made by George E. Snyder, Philadelphia 24, Pa., are designed for use on surface grinders to expedite grinding of faces of prismatic punches where accuracy obtainable with dividing heads is inadequate and where precise setting up by other methods from one face to another is time consuming. Only one clamp-up of workpiece is needed with these blocks to generate a square, octagon, triangle, hexagon or composite shape.

Check No. 16 on Reply Card for more Details

Multiuse Center

A bull nose, replaceable point center, designed so that the bull point can be removed quickly and another bull point inserted to accommodate the work without having to remove the center on the machine, is introduced by Ready Tool Co., Bridgeport, Conn. Designed as RED-E-Super-accurate multipurpose center, it is available in any required shank, taper or head size.

Check No. 17 on Reply Card for more Details

Flooring Compound

Wilbur & Williams Co., Brighton 35, Mass., offers a rubber-coat skid grip flooring compound that can be easily brushed on. It may be applied on metal, wood or concrete. It eliminates danger of slipping even under wet conditions.

Check No. 18 on Reply Card for more Details

Saves Operating Expense

Lower operating expense and reduced space requirements for control panels are available with the new miniature indicators and control units made by Bailey Meter Co., Cleveland 10, O. Designated as Mini-Line, the instruments make it practical to concentrate into a small space before a single operator all information and controls for operating one or more boilers, turbines or process units.

Check No. 19 on Reply Card for more Details

Heavy Duty End Mills

Heavy duty end mills with 2-inch diameter shanks and fast cutting helix are available from Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. Cutters have ample chip clearance for taking heavy end milling cuts. They range in diameter from 2 to 2½ inches and in length of cut from 4 to 6 inches.

Check No. 20 on Reply Card for more Details

Synthetic Resin Cement

Atlas Mineral Products Co., Mertztown, Pa., offers Vitroplast, a light colored synthetic resin cement that is resistant to many acids, solvents, greases and oxidizing agents such as sodium hypochlorite and chlorine dioxide. It sets hard in contact with concrete and metals and shows good adhesion properties for joining of brick and tile and adhering glass, concrete, metal and other materials.

Check No. 21 on Reply Card for more Details

Masonry Cutting Blade

Clipper Mfg. Co., Kansas City 8, Mo., announces the new B-R (break resistant) abrasive blade for masonry cutting. It is recommended for limestone, sandstone, light aggregate concrete products and dry press refractories, transite, etc. It will not damage if it is dropped, twisted or bent.

Check No. 22 on Reply Card for more Details

Gas-Fired Unit Heaters

A new line of gas-fired unit heaters including fan, blower and duct-type models, with sheet steel and cast iron heat exchangers is announced by United States Air Conditioning Corp., Minneapolis 14, Minn. Four point suspension permits rigid mounting without strain on gas lines or piping. Units are designed so that all heat generated by burning gas is delivered directly to the heat exchangers and then to the circulating air.

Check No. 23 on Reply Card for more Details

Protective Gas Atmosphere

Atmosand powder, developed by Marlyn Chemical Co. Inc., Calumet City, Ill., provides protective atmospheres of hydrogen, carbon monoxide and nitrogen suitable for use in non-generator equipped furnaces, induction and resistance heaters, etc., to prevent bluing, scaling and decarburization. It is nontoxic, nonflammable and free flowing.

Check No. 24 on Reply Card for more Details

Foot-Operated Valves

Quick-As-Wink foot-operated valves permit hammers, shears, presses, furnace doors and other types of air-operated machinery and equipment to be fully controlled by foot pressure on a pedal. Made by C. B. Hunt & Son Inc., Salem, O., the valving mechanism has a stainless steel body and push-pull rods, brass sleeves, and self-sealing U-shaped packers. Sizes are ⅜ to 1 inch, in 3-way, 4-way, neutral position and regular actions.

Check No. 25 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

The Metal Market

Demand for copper and aluminum in third quarter exceeds supply by about 35 per cent. Non-rated consumers will encounter increasing difficulty in obtaining requirements

SUPPLIES of major nonferrous metals will remain tight over the balance of this year regardless of outcome of present negotiations for a truce in Korea. Requirements for metals under the defense program are mounting and probably will not reach their peak until early 1952.

Total unrestricted demand for copper, aluminum and steel for the third quarter is about 35 per cent in excess of supply, Defense Production Administration says. Production of copper and copper-base alloys is expected to total about 557,000 tons in the third quarter; aluminum, 299,000 tons; steel, 20,825,000 tons.

In establishing program levels governing the use of these three metals in the third quarter, nondefense consumption was reduced in general by limiting purchases to fixed proportions of "normal" usage. In the case of aluminum, manufacturers of consumer durable goods other than automobiles were held, in general, to 50 per cent of their nondefense consumption during first half of 1950. Copper allowance was 60 per cent.

National Production Authority issued order M-74, prohibiting the use of copper or copper-base alloys in the manufacture of 30 items of building materials after July 1. The order, in effect, takes over many of the restrictions on the use of these materials in builders' hardware items formerly included in order M-12.

Order Full Zinc Allocation

Slab zinc will be placed under complete allocation beginning Aug. 1. NPA took this action in order to channel available supplies of the metal more effectively to the defense program and to civilian production. Amendment to order M-9 was deemed necessary by the continued shortage of zinc and by anticipated heavy zinc requirements of orders carrying ratings under CMP.

NPA said the regulation will assure not only sufficient zinc to meet rearmament needs, but also will provide for more equitable distribution of the remaining metal among nondefense consumers. The amendment is expected to be especially helpful to many small consumers who, in recent months, have been cut off from their normal sources of supply as a result of defense demands.

No person may accept delivery of slab zinc for any purpose beginning Aug. 1 unless such acceptance has been authorized previously by NPA on an approved allocation form. Excepted from this provision are: Deliveries of slab zinc to the General Services Administration for its stockpile; acceptance of slab zinc directly from a foreign source for the sole purpose of resale without change in form; small consumers of zinc.

Reports—All producers of slab zinc are required to file reports on the 20th of each month and consumers on the 15th. Other sections of the amendment permit NPA to direct producers to set aside a specific portion of their production to meet directives, and to assist in the placement of orders when holders of authorized allotments are unable to find sources of supply.

The shortage in zinc supplies tends to detract from the commendable record being written by the smelting industry. Production is second only to that of the peak World War II year, 1943. Output of slab zinc in the first half of this year totaled 467,643 tons, including June output of 77,679 tons. Lacking reserves, shipments are limited to about this level, having totaled 79,299 tons in June. Smelters' stocks at the end of June amounted to only 15,791 tons compared with 17,411 tons at the end of May. Unfilled orders now total 73,304 tons.

Explores Lead-Zinc Deposits

Two contracts were approved by Defense Minerals Administration for exploratory work on separate lead-zinc properties in Wisconsin. These are the first contracts approved in the upper midwest under the "matching fund" principle in which the government contributes a percentage of the cost in search for new sources of strategic and critical minerals. The government contribution for lead and zinc is 50 per cent.

Exploration contracts have been entered into with the following: E. P. Scallon, St. Paul, exploratory churn-drilling for a total of 4000 feet on lead-zinc property in Grant county, Wisconsin; total cost, $7500. Dodgeville Mining Co., Madison, Wis., exploratory drilling for a total of 6000 feet on lead-zinc property in Iowa county, Wisconsin; total cost, $8040.

$500 Million Alcan Plant

Aluminum Co. of Canada's new reduction plant in Northern British Columbia will cost $500 million. With production pegged at 1.1 billion pounds of pig aluminum annually, plant will require tremendous electrical energy. First stage of power development will supply 800,000 horsepower. Water will be plunged through a 10-mile tunnel beneath the peaks of the Tahtsa Mountain range to the turbines. British Columbia offers cheap electrical power, and location was chosen with this in mind. Bauxite will come from British Guiana, cryolite from Greenland, fluorspar from Southern Europe.

RFC Tin Stocks Increase

Reconstruction Finance Corp. has made no move so far to re-enter the world tin market. Trade reports indicate that its sales in the first six months of this year were slightly less than new supplies obtained from the Texas City, Tex., smelter. RFC's stocks are believed to have gained slightly over the 18,618 tons reported on Jan. 1. The agency's selling price holds at $1.06 a pound for Grade A.

INVASION PIPE: Lightweight aluminum pipe is dropped by a fast-moving helicopter in rugged tests at Ft. Belvoir, Va., to determine suitability for carrying fuel, oil and water to operation areas of a mobile army and an emergency-based air force. The aluminum invasion pipe was a cooperative development of Army engineers and Aluminum Co. of America. Helicopters can carry at least double their normal pipe load when pipe is made of aluminum. Here twelve 20-foot lengths are dropped

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c. Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 106.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $210-213 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; effective May 23, 1951)

Sheet: Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18; 90% 39.78; red brass, 85% 38.86; 80% 38.47; best quality, 38.07; nickel silver, 18%, 50.99; phosphor-bronze grade A, 5%, 59.42.

Rod: Copper, hot-rolled 36.03; cold-drawn 37.28; yellow brass free cutting, 31.70; commercial bronze, 95%, 39.87; 90%, 39.47; red brass 85%, 38.55; 80%, 38.16.

Seamless Tubing: Copper 40.22; yellow brass 40.29; commercial bronze, 90%, 42.44; red brass, 85% 41.77.

Wire: Yellow brass 37.57; commercial bronze, 95%, 40.47; 90%, 40.07; red brass, 85%, 39.15; 80%, 38.76; best quality brass, 38.36.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10, l.c.l. 30.18, 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0065	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July 2-12	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 28-30	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 18-27	24.50	16.80	17.50	106.00	19.00	42.00	56.50	87.75
June 15-16	24.50	16.80	17.50	111.00	19.00	42.00	56.50	87.75
June 14	24.50	16.80	17.50	118.00	19.00	42.00	56.50	87.75
June 13	24.50	16.80	17.50	123.00	19.00	42.00	56.50	87.75
June 8-12	24.50	16.80	17.50	129.00	19.00	42.00	56.50	87.75
June 7	24.50	16.80	17.50	136.00	19.00	42.00	56.50	87.75
June 1-5	24.50	16.80	17.50	136.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16

NOTE: Copper; Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime west, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refineery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl. 33.00c; up 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 79.20c; 100 or 350 lb drums only, 100 to 600 lb, 64.50c; 700 to 1900 lb, 62.00c; 2000 to 9900 lb, 60.20c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel, silver, 10%	21.50	21.25	10.75
Phos. bronze, A	27.00	26.75	25.75

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

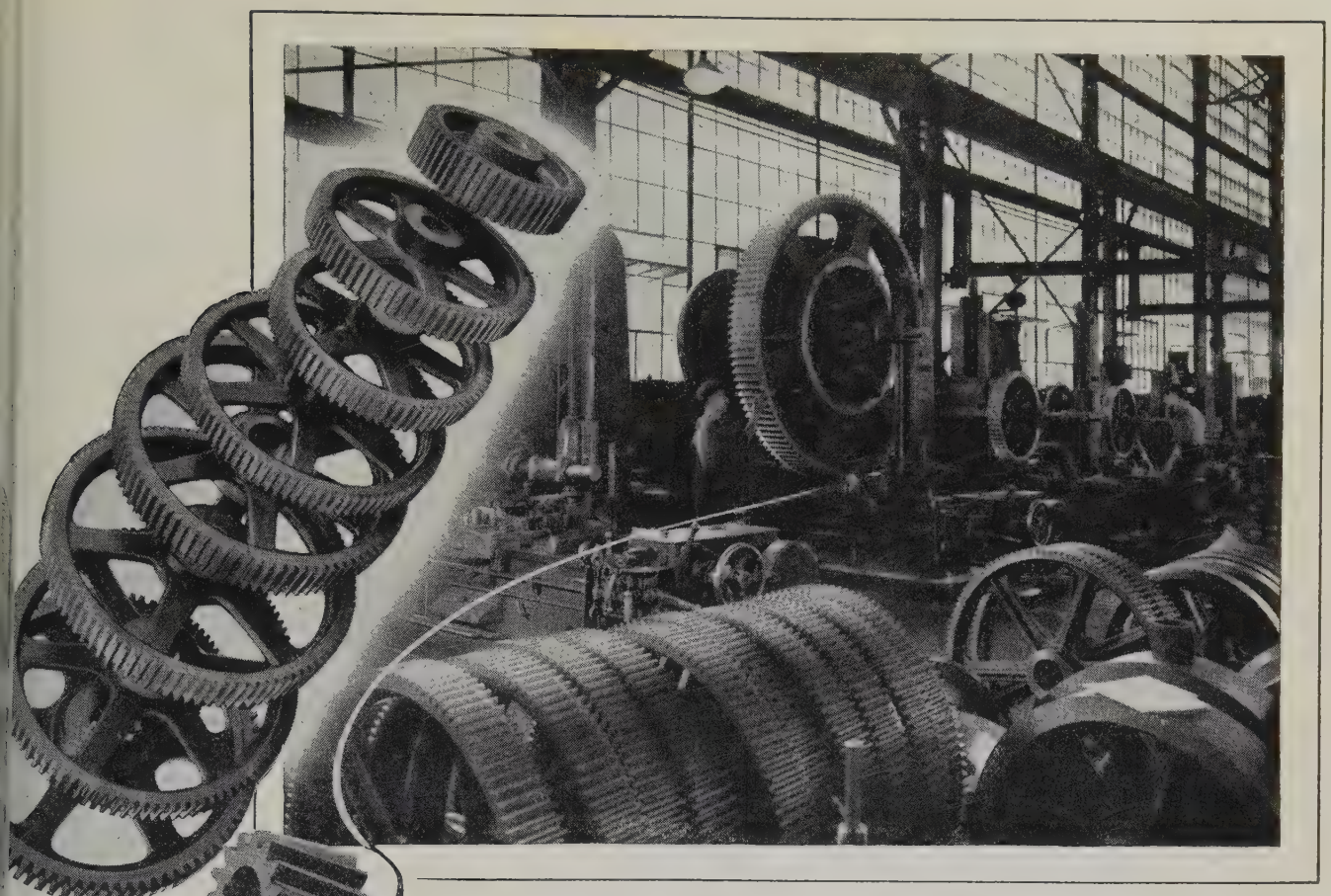
(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c, in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.



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of Neloy (OR NELOY MOLY)
THE Preference of INDUSTRY

(NE) is the symbol of quality recognized by users of industrial gears everywhere. Our Foundries specialize in Gear Blank Castings of Alloy and Carbon Steel. The facilities of the National-Erie Corporation at your command, permit complete control from raw material to the finish machined gears. Spur, bevel and Sykes Herringbone of Neloy (or Neloy Moly) meet with outstanding success in industry because they are giving excellent service in many varied applications.

First and final costs of Neloy (or Neloy Moly) gears are reasonable. The (NE) Flame Hardening Process combines the high surface hardness of carburized or case hardened treatment, combined with the toughness of a fully quenched medium carbon alloy steel.

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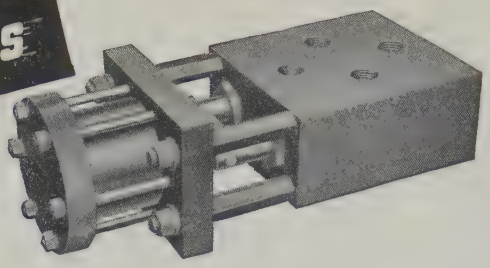
ERIE, PENNSYLVANIA • U. S. A.

Quick-As-Wink AIR AND HYDRAULIC Control Valves

¾ Inch 4-Way — 5000 p.s.i. Piloted Hydraulic Valve



PILOT OPERATED Hydraulic Valve

For hydraulic systems to 5000 p.s.i.

● Designed for controlling double acting hydraulic cylinders. The pilot cylinder is controlled by any-type of 4-way air valve and is operated either automatically or manually from a convenient control station. Machined steel housing, hard chrome plated ground and polished stainless steel plungers, molded packers sealed by valve pressure. All parts readily accessible without disturbing the piping. ½″ to 4″ sizes. *Write for full details.*

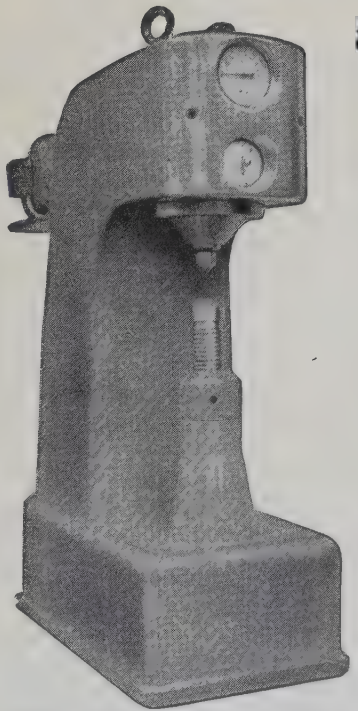
THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

Quick-As-Wink AIR AND HYDRAULIC Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1924 East Pershing St., Salem, Ohio

Brinell Testing at PRODUCTION LINE SPEEDS



Simply set tolerance hands on the lower dial of this Brinell Hardness Tester to the desired limits and the operator merely notes that the indicator points stop within them.

No grinding or preparation of parts is necessary. Foot operation permits free use of both hands. Tests are completed as rapidly as the operator can handle the parts.

Standard Brinell test loads are used . . . machine is motor-driven . . . loads are applied hydraulically . . . round and flat parts are handled equally well . . . no springs or delicate clutches to affect load.

GET FURTHER DETAILS

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DETROIT TESTING MACHINE CO.

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Tubular Goods . . .

Tubular Goods Prices, Page 139

Boston—If fourth quarter plate allocations for natural gas lines are not recommended, status of numerous orders for lead-in lines placed by utilities is uncertain. These involve substantial foreign lots. However, reversing an earlier move, plates for the New England main line pipe may now be recommended by PAD. Distributors are taking allocations of merchant steel pipe, but there is an easing in pressure, notably on smaller buttweld sizes with some diverting small lots. Seamless is sold through September at set-aside limits.

Sheets, Strip . . .

Sheet and Strip Prices, Page 135 & 136

Pittsburgh—Most September rolling schedules are set; only a limited tonnage of hot-rolled sheet will be available, about 95 per cent going for defense and directives. Cold-rolled sheet supply for September will be better than the hot-rolled situation, but less tonnage will be available than in August, Estimated 80 per cent cold-rolled sheet tonnage will go for defense and related effort.

Much of the confusion attending transition to CMP has disappeared. No relief is expected on hot or cold-rolled sheets in view of the steadily mounting defense and directive tonnage. Virtually all producers expect full CMP by fourth quarter, barring a change in the government's preparedness program. Step in this direction is NPA order to devote 70 per cent minimum August production to defense, 54 per cent minimum of cold-rolled, 80 per cent minimum of galvanized and 95 per cent minimum of electrical sheet.

New York—Sheet sellers report a rapidly mounting volume of CMP orders for fourth quarter. Consumers can now place up to 70 per cent of their third quarter orders for the final three months of the year. Later, when they receive formal allocations from Washington, they likely will be able to step up their tonnage for that position. Meanwhile, most producers must cut into their 45-day lead time in arranging September schedules.

Boston—With most cold strip converters getting allocated hot-rolled tonnage near specified volume, controlled distribution for September approximates 60 per cent of scheduled output. Open-end volume will be about 40 per cent, indicating that more consumers of cold strip will not be too badly pinched for steel. Some progress toward elimination of overdue tonnage is being made.

Philadelphia — Hot and galvanized sheets are in tight supply, somewhat in contrast with the situation in cold-rolled. At least some cold-rolled tonnage is expected to be available for non-rated consumers in September; little, if any, of the other grades of sheet likely will be on hand. There is less demand for cold-rolled for defense, as reflected by the new set-asides: 54 per cent for cold-rolled against 70 per cent for hot-rolled and 80 per cent for galvanized.

Middletown, O.—Armco Steel Corp. has begun work on a $2 million proj-

to increase its Butler, Pa., Divi-'s production of electrical steel. attery of new annealing furnaces eing constructed and equipment is g added to process this type of l. In addition, new shears are be- installed and the shipping facili- of the plant are being increased.

os Angeles — Materials shortages production restrictions caused e-scale worker layoffs at district omobile plants. Lighter consum- buying has lowered gray market el prices to mill price plus $50 per

hicago—Sheetmakers must revise tember schedules to comply with NPA directive of July 9 limiting nage going to essential uses. tember schedules are almost com- tely filled with CMP revalidations. addition, considerable new CMP nage has come in recently.

ire . . .

Wire Prices, Page 137

Boston — Production and distribu- n of rods will determine extent IP allotments are met in third arter and beyond. Hurt by vaca- n losses, semifinished tonnage is ited and, if 90 per cent allocation converters is met, there will be no en-end volume. Limited rod supply dangers ability of mills to meet late ird quarter CMP allotments which e generous in most cases to consum- s qualifying under "B" list products.

teel Bars . . .

Bar Prices, Page 135

Boston — Limited cold-rolled bar nnage in small sizes will be avail- le in September beyond controlled lume, although heavy run of revali- ted orders for carbon grades came te at deadline. Some CMP volume being booked for fourth quarter in th carbon and alloys. Mills are riving to get out as much overdue nnage in August as possible. Ton- age not qualifying for revalidation r September under CMP has been opped.

Pittsburgh—Bars are in most crit- al supply straits of any product. PA placed hot-rolled bar set-asides r September at 78 per cent mini- um of expected production. No an- ouncement has been made concern- ng cold-finished or alloy bars, but ntire production of both products is xpected to go for defense. Trend oward complete CMP is evident and, f government defense spending con- inues after Korean peace, entire pro- uction will be controlled by fourth uarter.

There is little hope for relief in bar narket with mounting defense de- nands. Seventy-five day lead time or cold-finished bar rolling schedules neans that September producing lans are about set.

Philadelphia — Jump in hot-rolled ar set-asides to 78 per cent did not nake too much difference with a umber of sellers, for they were al- eady loaded up with rated business or September. Many CMP's that ame in along with the DO-conver- ions likely will be carried into fourth uarter. Non-rated consumers are ut of luck completely in such cases.

Los Angeles — Kaiser Steel Corp. eased production of merchant bars.

No. 1491-CS-3
½" 3-Way Solenoid
Operated Air Valve

SOLENOID OPERATED Air Valves

fast, positive, dependable operation

● These valves are widely used for controlling single action air cylinders, clutches, etc. Can be operated with a variety of power switches, mercoid switches or automatic contact switches activated by moving objects. Stainless steel push-pull rods, brass sleeves and U-packings expanded by pressure and all enclosed against dirt, assure long, efficient, trouble-free operation. No metal to metal seating. Precision made. Individually tested. Spring or double solenoid return. ⅜" to 1½" sizes: 2-way, 3-way and 4-way actions. *Write for full details.*

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Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1929 East Pershing St., Salem, Ohio

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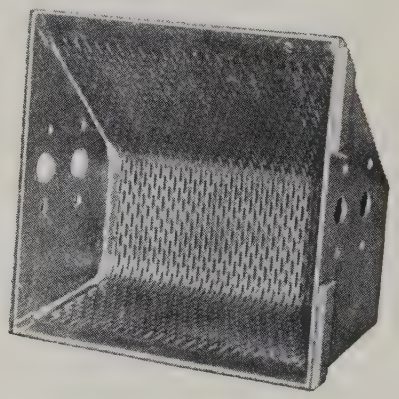
Manufacturing Facilities



Hendrick is exceptionally well equipped to manufacture to specifications a wide range of metal products that involve such operations as perforating, shaping, forming, welding, brazing, riveting, etc. The perforated elevator bucket illustrated is typical of the many specialized articles for whose fabrication Hendrick has unusual facilities. Write us in detail regarding any metal product you desire fabricated.

1876—SEVENTY-FIFTH ANNIVERSARY—1951

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Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

30 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Aircraft fabricators' bar requirements are down 20 per cent. Cold-drawers are booked three months ahead on rated orders, representing 75 per cent of total orders.

Plates . . .

Plate Prices, Page 135

Philadelphia—Plate supply is acute. Latest schedule of set-asides is 92 per cent for sheared plates, plus an additional 3 per cent for Navy tonnage directives, and 95 per cent for strip plate. Considering the probable carryover from August, plate mills will have nothing left for unrated tonnage. Most mills were loaded up with rated orders before this latest increase in set-asides was announced.

Lukens Steel Co. resumed operations on its 140-inch mill July 12 after a suspension for repairs since the first of the month. Alan Wood Steel Co.'s 84-inch mill, which was closed down for repairs June 28, is expected back in operation no later than July 23.

Boston—While all DO orders have been validated under CMP, volume is not heavy in this district compared with overall plate directives. Plate distribution will be largely by directive; demand for listed "B" products being relatively light, fabricators in some instances actually take reductions under CMP. Exceptions are weldment shops with backlogs heavily filled with former DO orders. For September, open-end tonnage will be lower. Small tank fabricators are booking more defense volume, but in some cases recent heavy deliveries of heads overbalance plate receipts.

Pittsburgh—No free tonnage will be available to plate users in September. Plate production is entirely on a directive basis. Fabricators who hold non-rated jobs complain bitterly since their supply is shut off. Full CMP is in effect so far as plate production is concerned. NPA order telegraphed to producers July 6 specified order of priority with directive, ACM and rated orders in that sequence.

Chicago — With advent of CMP plate users are requesting tonnages widely in excess of amounts heretofore taken. Behind the move is the desire of consumers to obtain accommodation at mills close at hand to reduce freight charges. Under the new NPA directive, plate mills now must reschedule and reject overages previously booked

Birmingham — Pressure for plates continues. Mills are on a virtual capacity schedule, but demand exceeds supply. Car-building continues as the prime plate consumer, although considerable construction is evident in the district.

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Since 1905. Engineers and manufacturers of Conveyers and Conveyer Systems for the Metal-working Industries.
Three modern plants. Engineering Offices in All Principal Cities. There's an Engineering Sales Office near you.
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ELLWOOD CITY · PENNSYLVANIA
SAN CARLOS · CALIFORNIA
PORT HOPE · ONTARIO, CANADA

Structural Shapes . . .

Structural Shape Prices, Page 135

New York — Fabricators recently received a number of orders certifying DO rated tonnage under CMP for third quarter delivery, but they don't know what they are going to be able to do with them. They are overbooked for July and August and have far more orders than they can possibly handle for September. Much depends on what they can get from the mills for September shipment. They have heavy fabricating schedules on other work that will have to be considered.

Some of the present difficulty stems from the fact there was a substantial influx of DO ratings at the tag end of June against orders that were already on fabricators' books. Fabricators had urged contractors for some time to get ratings, but it was not until late June that several took action. These DO ratings were in excess of what the shops could handle in the third quarter and the conversion of these ratings to CMP leaves the situation no better off.

Boston—Rated fabricated structural steel contracts, validated under CMP for third quarter delivery, overextend shops and mills. Some tonnage will go into fourth quarter when confusion attending switch to new controls is expected to clear. Crux in scheduling shop operations centers in plain material with structural mills set up for September rollings. Where shop backlogs extend six months to one year, this being the case with larger fabricators, considerable readjustments are likely if original scheduled deliveries are to be met.

Pittsburgh—NPA requires structural producers to put 90 per cent of their expected output into the defense effort. Non-rated construction has practically vanished, fabricators being reluctant to take non-rated work with possibility of structural production going entirely for defense. Demand for light structurals runs high.

Philadelphia—A heavy amount of defense construction is accumulating. About the only other work being figured are bridges and some hospitals and schools approved by Washington.

Warehouse . . .

Warehouse Prices, Page 141

Philadelphia—Distributors' mill receipts so far this month are below those for the like period in June. Plates and bars are in particularly low supply. One large distributor's stocks of cold-finished bars are only one-sixth of what they were a year ago, with popuar sizes virtually cleaned out. Some consumers of cold-finished are buying hot bars out of warehouse and are having them drawn to size by cold finishers, an expensive operation.

Pittsburgh — Receipts of distributors are at highest level in months, although demand far outstrips receipts. Warehousemen are not able to replenish inventories. Warehouses will receive no additionnal tonnage under CMP and, unless defense program is reduced, distributors can hope for no improvement in future supply.

Los Angeles—Vacation lay-offs and lag in switching-over from civilian to defense production is easing pressure for warehouse steel. Warehouse shipments in June were 10 per cent less than in May.

San Francisco—Distributors' inventories continue to dwindle. Warehouse executives hope the turning point will come in the fourth quarter when CMP will have several months of experience behind it. Meantime, most acute items in the whole supply picture are the alloys and stainless.

Iron Ore . . .

Iron Ore Prices, Page 141

Cleveland—Iron ore lake shippers established a new record for June, totaling 13,166,130 tons and representing a gain of 1,428,179 tons over the June, 1950, total. Shipments from the Superior district for the July 4 holiday week amounted to 2,905,298 tons, lifting the movement so far this season to 35,556,990 tons compared with only 24,729,457 tons for the like period a year ago.

Pig Iron . . .

Pig Iron Prices, Page 134

Boston — Shipments to contract customers by Mystic Iron Works under terms of mutual agreement are being resumed after brief stoppage over pricing for third quarter. Consumers of foundry and malleable will pay more; Everett furnace price under schedule B of contracts is $55.25, furnace for No. 2 foundry, an advance of $3.50. GCPR price based on first quarter was $53.25 and contract price second quarter $51.75. For a few days, shipments came to a halt due to failure of OPS to approve contract pricing.

From March to May, 47 per cent of ore consumed was of foreign origin over which OPS has no control.

New York—District foundry melt regained June levels, following suspensions for vacations by various shops earlier this month. Another dip is expected in August, at which time still other foundries will suspend for vacations.

The seasonal lull has eased the pressure for pig iron, although most shops are taking all the iron they can get to replenish inventories. Were it not for the abnormally heavy proportion of scrap now being used, many foundries would be forced to curtail average weekly production. As it stands, most of them can maintain a five-day week operation. Some are working overtime, but only in other than their melting departments. Little foreign iron is being bought these days because of the high cost and uncertainty as to deliveries and specifications.

Buffalo — Tightness continues to grip the pig iron market despite vacation periods which have shut down one of the district's leading melters for two weeks. Area pro-

duction rate may return to capacity this week as the one idle stack, may be relighted.

Pittsburgh — Pig iron purchasers expect supply to improve in event of Korean peace, but this remains doubtful. Iron production has fallen slightly with two of the 54 district stacks down for repairs which won't be completed for at least six weeks.

Philadelphia — While seasonal influences are reducing foundry iron requirements, demand still exceeds supply. Basic iron is in especially short supply, although consumers are still willing to take more foreign iron at current prices.

Cincinnati — Pig iron market is quiet, although numerous foundry vacations have not lessened demand. The supply outlook is more unfavorable because of the disappearance of foreign iron. Beehive coke is hard hit place on an easing in the oven coke market.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 139

Pittsburgh—Oven coke demand is considerably reduced over last few weeks. With two district blast furnaces off for repairs there is opportunity for some limited inventory-building. Coke of metallurgical grade is no longer a problem for foundries or steel plants here. Connellsville beehive demand has fallen and market is slow despite shipments of this grade to other coke-consuming areas.

Chicago—Foundry coke is offered freely. Lack of storage space prevents foundries from stockpiling during vacation shutdowns.

Scrap . . .

Scrap Prices, Page 142

Pittsburgh—Movement of scrap is improving slightly, but the supply situation is still critical. Inventories are dangerously low and supply is not great enough to replenish stocks. Upgrading continues to be common, but complaints from purchasers are few since they are anxious to get scrap at any price. OPS issued warnings that arrests will follow any uncovered instances of upgrading. OPS is changing charges from misdemeanors to felonies to mete out stiffer penalties to offenders. Cases of "tie-in" sales of scrap are noted. A dealer sells scrap to a producer in exchange for right to purchase finished steel, which is later sold on black market at great profit.

New York — Stringency in steel scrap is reflected by continued allocations of material at dealers' yards. Practically all scrap is being allocated. Hot weather and vacations have tended to slow yard collections and preparation of material, but by far the major cause of shortage is the heavy consumer requirements. Steel mills, some of which have only meager stocks on hand, continue to press for tonnage in an effort to sustain better than 100 per cent operations. Some consuming plants are easing operations due to vacations, but even these take all the scrap they can get to replenish inventories.

Boston—While melt by steel mills and foundries is lower this month due to vacations, steel scrap is scarce. General inventory position of melters has not been improved. Higher prices at several ports, compared with f.o.b. quotations, are drawing in some tonnage for barge shipment, chiefly for Buffalo.

Chicago—Scrap situation is unchanged with consumption steady. Less material is being allocated away from this district and the few mills near distress are receiving somewhat larger shipments against allocations. Demand for foundry grades has lessened with many jobbing foundries closed for vacation.

Cincinnati—Mills and foundries are making no progress in efforts to build scrap inventories. Suppliers are hard pressed to support the high level of melt; reliance on allocations is expanding. None in this district is cancelling allocations of scrap.

Birmingham — Demand for cast scrap has eased considerably, while steel scrap remains extremely tight. NPA allocated much Florida scrap, one of the largest suppliers of the district, to northern mills, thus aggravating the situation.

Los Angeles—Six destroyer escort vessels purchased by Kaiser Steel Corp. will provide 5000 tons of scrap for Fontana mill. Bidding is active on 100,000 tons of steelmaking scrap offered by Republic of Korea in appreciation of assistance.

San Francisco—Small tonnages of steel scrap have been arriving from the Hawaiian Islands to supplement domestic recoveries, yet the inventory situation continues to deteriorate. Lightness of shipments from Hawaii is attributed to a shortage of bottoms.

Seattle—Steel scrap continues to arrive in increasing volume, but local shipments are of poor quality. Volume of material coming from Alaska and the Pacific area is heavier and gives better results. Military and mining scrap shipments from Alaska are seasonally larger. A cargo of 9000 tons from the western Pacific arrived this week for Isaacson Iron Works.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7000 tons, Aluminum Co. of America's reduction plant, near Wenatchee, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

4500 tons, units 2, Cromby station, Philadelphia Electric Co., Philadelphia, to Bethlehem Steel Co.

4255 tons, including 3706 tons silicon steel, South Broad street overpass, New Orleans, to Virginia Bridge Co., Birmingham; also 115 tons cast steel; Farnsworth & Chambers Co. Inc., Houston, contractor-engineer.

2385 tons, Army buildings, Fort Eustis, Va., through Virginia Engineering Co., Norfolk, Va., to Lehigh Structural Steel Co., Allentown, Pa.

525 tons, alert hangars, Presque Isle, Me., Burlington, Vt., and Chicopee Falls, Mass., to Butler Mfg. Co., Minneapolis.

425 tons, additional buildings and facilities, Air Force Base, Limestone, Me., to Bancroft-Martin Rolling Mills Co., Portland, Me.; Volpe Construction Co., Malden, Mass., general contractor.

350 tons, alert hangar, Falmouth, Mass., to American Bridge Co., Pittsburgh.

100 tons, housing project 41-1, Huntsville, Ala., to Sherwood Moore Co., Birmingham; R. P. Farnsworth Co., New Orleans, general contractor; reinforcing to Joseph H. Fox Co., Birmingham.

STRUCTURAL STEEL PENDING

2000 tons, Mount Rainier ordnance depot warehouse, Washington state; bids to be invited immediately.

1000 tons or more, 300-foot square hangar, Eielson air field, Alaska; general contract to P. Kiewit & Sons Co., Seattle, $3,671,313.

1000 tons, Lehigh county bridge, Catasauqua, Pa.; bids Aug. 2.

550 tons, power house, Central Electric Power Co-op, Shamois, Mo.; bids closed July 13.

150 tons, factory, Lenear Corp., Plymouth Meeting, Pa.; bids closed July 7.

125 tons, steel superstructure, bridge, Cathance river, Bowdoinham, Me.; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1830 tons, contract C-3 deck, and contract C-1 substructure, Boston connection, part 1, Central Artery, Boston, to Bethlehem Steel Co.; V. Barletta Co., Boston, general contractor; bids June 12.

1525 tons, contract B-1 substructure, and B-3, deck, Charlestown connection, Central Artery, Boston, to Bethlehem Steel Co.; Berke-Moore Co. Inc., Boston, general contractor.

965 tons, South Broad street overpass, New Orleans, to Orleans Materials & Equipment Co., that city; also 101 tons blast plate and 113 tons roadway armor; Farnsworth & Chambers Co. Inc., Houston, contractor-engineer.

425 tons, dormitory, Wellesley College, Wellesley, Mass., to United States Steel Supply Co., Cambridge; George A. Fuller Co., Boston, general contractor.

360 tons, walls, foundations, etc. Navy oil terminal, Mukilteo, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Dahlgren Construction Co., Seattle, general contract, $1,429,856.

250 tons, contract E-1, substructure and approaches, Central Artery, Boston, to Bethlehem Steel Co.; C. J. Maney Co. Inc., Boston, general contractor.

180 tons, dental school building, University of North Carolina, Chapel Hill, N. C., to Easterby & Mumaw Inc., Charlotte, N. C.; J. A. Jones Construction Co., Charlotte, general contractor; Carolina Steel & Iron Co., 62 tons fabricated structural steel.

110 tons, mesh, state highway, Warwick-West Warwick, R. I., to Wickwire-Spencer Steel Co., Boston; bridge, 65 tons, to American Bridge Co., Pittsburgh; S. M. Construction Co., Providence, R. I., general contractor.

100 tons, Navy oil terminal, Manchester, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; MacRea Bros., Seattle, general contract.

100 tons, addition, Melrose Hospital, Melrose, Mass., to Concrete Steel Co., Boston; Joseph J. Vaccaro, Somerville, Mass., general contractor.

PLATES . . .

PLATES PLACED

100 tons or more, 500,000-gallon elevated water tank, Fort Lauderdale, Fla., to Chicago Bridge & Iron Co., Chicago, $99,400.

PLATES PENDING

1000 tons, or more, including structurals, 1000-ton dry cargo ship for Army Transportation Corps; general contract to Puget Sound Bridge & Dredging Co., Seattle, $1,446,685.

PIPE . . .

CAST IRON PIPE PLACED

315 tons, mainly 16-inch, Fall River, Mass., to R. D. Wood & Co., Florence, N. J.

CAST IRON PIPE PENDING

250 tons, 30-inch, Logan Airport, Boston.

RAILS, CARS . . .

LOCOMOTIVES PLACED

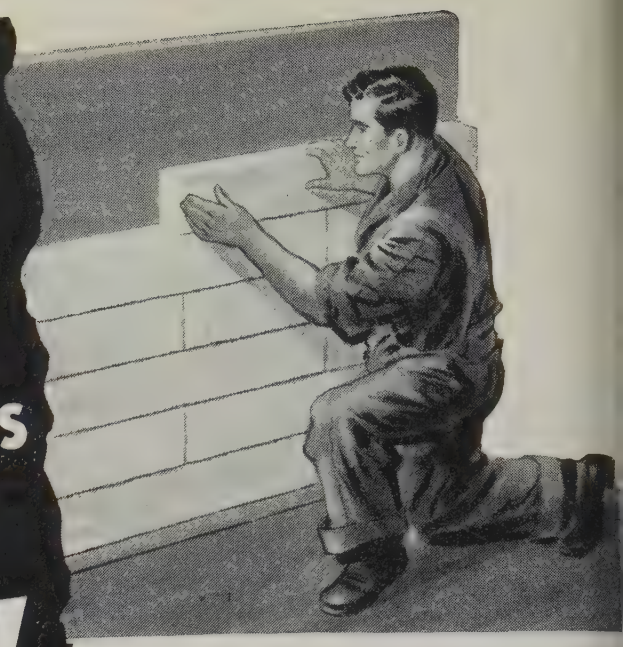
New York, New Haven & Hartford, ten 1600-hp diesel-electric road switchers and five 1600-hp diesel-electric road freight units, to American Locomotive-General Electric Companies, Schenectady, N. Y.

Pakistan, 23 broad-gage diesel-electric locomotives, to American Locomotive Co., New York.

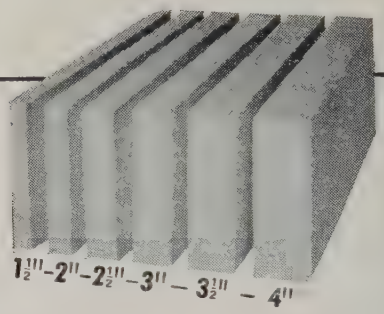
RAILROAD CARS PENDING

Western Pacific, 400 gondola cars and 100 hopper cars; bids asked.

Why the lowest cost open hearth producers use SUPEREX for regenerator insulation



The large size of the Superex blocks saves construction costs



Superex blocks are furnished in various standard sizes and thicknesses

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Superex provides these savings year after year. Made of calcined diatomaceous silica and asbestos, it presents a formidable heat barrier. It maintains its high insulating efficiency indefinitely on temperatures to 1900° F. . . . does not disintegrate . . . retains its high physical strength . . . resists the stresses of open hearth and other mill operations.

Higher operating temperatures with Superex result from its ability to reduce air infiltration. This advantage is traced to its unique structure and low permeability.

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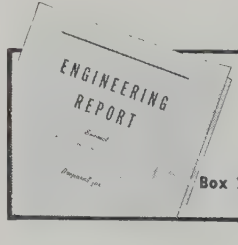
To help you gain the greatest savings from Superex, Johns-Manville has prepared an engineering report, "Open Hearth Regenerators—a comparison of various insulation specifications." This report indicates the economic thickness o Superex to use as related to th costs of various types of fuels. T obtain this booklet, write Johns-Manville, Box 290, New York 16, N. Y.



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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

arman To Triple Output

Recently granted an emer- ncy loan of $1,250,000 for rchase of land, construc- n of buildings and acquisi- n of machinery and equip- ent, Marman Products Co. c., Inglewood, Calif., will iple manufacturing facili- es by construction of a lant at 11214 Exposition lvd., West Los Angeles, alif. The firm manufac- ures clamps, straps, coup- ngs, and aircraft fastening evices. The Defense Pro- uction Administration ex- ended an additional $400,000 r working capital.

Will Enlarge Indiana Plant

Joy Mfg. Co., Pittsburgh, lans to enlarge its Mich- gan City, Ind., plant. The ew facilities, which will ost about $800,000, will add 2,000 square feet to the resent plant and permit an ncrease in productive ca- acity of about 35 per cent. Production at the plant in- ludes air compressors, a wide range of large drills sed in mining and construc- ion, as well as equipment or the oil drilling indus- ry.

American Metal Products Co.

American Metal Products Co. Inc., Los Angeles, com- pleted construction of a warehouse addition in that city. Sheet metal, vent caps, roof lashing, sheet metal pipes and fittings are manu- factured.

Plans Electronics Factory

Radio Corp. of America-Victor Ltd., Montreal, pur- chased a 100-acre tract of land near Prescott, Ont., for an electronics factory.

Offers German-Made Rolls

Koelsch-Foedzer Works, Siegen, Westfalia, Germany, makers of rolls for the proc- essing of ferrous and non- ferrous metals, opened a sales engineering office at 123 First Ave., New York, in charge of F. L. Floss. The company is offering deliv- eries within eight to ten weeks and is quoting prices at somewhat under domes- tic levels.

Line Material Buys Property

Line Material Co., a divi- sion of McGraw Electric Co., Chicago, will build new fac- tory units on property ad- jacent to its Central plant in South Milwaukee, Wis. The first unit, a boiler room, probably will be started next spring. The three year pro- gram for the plan, begun in 1950, includes plans to re- place all but two of present manufacturing buildings. An addition to Line Material's Kyle Products plant in South Milwaukee is under way and will increase that plant's size by about 30 per cent. The company is also constructing new plants in Olean, N. Y., and Sherman, Tex.

Essick Buys Machinery Firm

Sterling Machinery Co., Kansas City, Mo., has been purchased and moved to Los Angeles, Calif., by Essick Mfg. Co., Los Angeles. Es- sick recently completed con- struction on a factory addi- tion to facilitate production of road rollers, mixers, hoists, pumps, compressors and evaporative air coolers.

Expands Chemical Plant

Construction is under way on an $8.5 million expansion of the chlorine and caustic soda producing facilities at Pittsburgh Plate Glass Co.'s Natrium, W. Va., plant op- erated by Southern Alkali Corp., a wholly-owned sub- sidiary. Originally granted a certificate of necessity by DPA covering 50 per cent of an estimated $10.2 million for the plant addition, the company has revised its cost estimates to $8.5 mil- lion or less.

Plans $3 Million Expansion

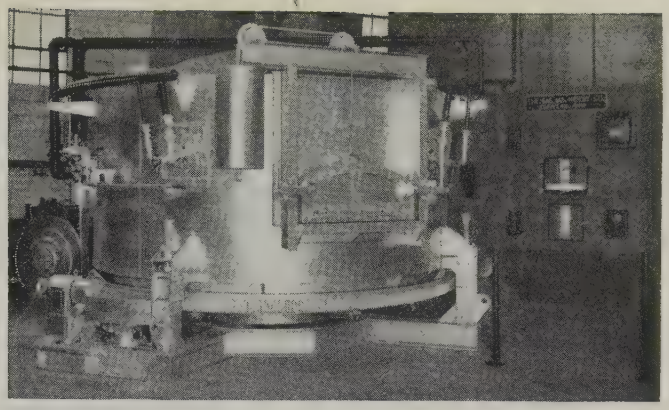
Aetna-Standard Engineer- ing Co., Youngstown, has undertaken a $3 million ex- pansion of its Ellwood City, Pa., plant, to enable the company to boost its defense work. The project involves over 150,000 square feet of manufacturing space, plus purchase of considerable equipment, including ma- chine tools. Plans call for a new foundry and general of- fice building and for doub- ling the machine shop.

Boosts Oxygen Production

Granite City Steel Co., Granite City, Ill., a year ago installed two generators of large capacity which the company leased from Air Products Inc., Allentown, Pa. On June 25, Granite City placed in operation a very large additional generator increasing its oxygen pro- ducing capacity by 60 per cent.

Cincinnati Gets New Plants

Work is starting on ex- pansions by two interests, on adjoining tracts in the Evendale district, Cincin- nati. Pollak Steel Co. will construct a warehouse and fabricating plant while U. S.- Burke Machine Tool Co.,



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Good Technique and the Right Rod for the Job Reduce Electrode Waste up to 40%

You can deposit more weld metal, in less time and avoid wasting electrodes by using approved techniques, the right electrode for the job, and by following the manufacturer's recommendations. G-E electrodes give you high deposition rates, meet AWS specifications, and are available in a wide variety of sizes and types.

Get 40 percent more from your electrodes today by:

1. **Avoiding bending whenever possible**
2. **Using electrodes down to a 2-inch stub**
3. **Providing better "fit-ups"**
4. **Protecting welding rods through better storage and care**
5. **Laying flat-face fillets on vertical fillet welds**
6. **Making fillet legs of equal length on horizontal fillets**

Check your horizontal and vertical fillet-welds against the illustrations on the right. Watch for future hints on improved welding techniques.

Accurate Measurement of Weldments Is Easy with this Gage

Check welds with this corrosion-resisting, stainless steel fillet-weld gage. It is a necessary tool for providing a quick, easy, accurate means of gaging fillets having either straight, concave, or convex contours of the following sizes: ¼ in., ⅝ in., $\frac{7}{16}$ in., $\frac{5}{16}$ in., ⅜ in., and ½ in. Easy to carry, it comes complete in a leather case.

Get yours today from your nearest G-E Welding Distributor. He can give you additional hints on how to get the most from your electrodes and equipment. You can find his name in the yellow pages of your telephone directory. Look for "General Electric" under "Welding Equipment."
General Electric Company, Schenectady 5, N. Y.

ON VERTICAL FILLETS

WASTE

On vertical fillets, you may be wasting as much as 40 percent of your weld metal. A poor contour, as shown above, may be due to one or more of the following conditions:

- **Arc length too short**
- **Electrode too large**
- **Forward travel speed too slow**
- **Excess whipping**
- **Excessive current. Metal runs out**
- **Wrong electrode for the job**

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- **Use welding current recommended by the electrode manufacturer**
- **Use as large an electrode as plate thickness will allow, but not larger than $\frac{3}{16}$ inch in diameter**
- **Increase travel speed**
- **Change to electrode better suited for this type of joint**

ON HORIZONTAL FILLETS

WASTE

On horizontal fillets, you may be wasting as much as 30 percent of your weld metal. A poor contour may be due to one or more of the following conditions:

- **Electrode held at wrong angle**
- **Electrode too small for size of fillet**
- **Excess current, metal runs down**
- **Arc length too short, causing overlap**
- **Forward travel speed too slow**
- **Wrong electrode for this type of joint**

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- **Hold electrode at proper angle**
- **Use as large an electrode as possible**
- **Use welding current recommended by the electrode manufacturer**
- **Increase travel speed**
- **Use proper electrode for this type of joint**

712-6

GENERAL ELECTRIC

thage, O., will build a plementary plant. Rob- on Steel & Iron Co. and Ransohoff Inc., both of cinnati, acquired acreage he vicinity but disclosed plans for utilization of properties.

Build Manganese Plant

exas International Man- ese Corp. plans to build 500,000 manganese con- trating and sintering nt at Brownsville, Tex. put is expected to reach eral thousand tons nthly. Low-grade man- ese ore will be imported m Mexico.

te-Roth Machine Expands

White-Roth Machine p., Lorain, O., added an- er building to its plant. e new structure, housing nufacturing operations special government k, increases production a by over 40 per cent. e former plant will house ricating and assembling rations for the company's e of diesel and gas en- es and compressors and nufacturing operations special processing equip- nt.

neral Controls Builds

General Controls Co., 801 en Ave., Glendale, Calif., constructing a 24,000 are foot building. Auto- tic pressure, temperature, el and flow controls are nufactured. Completion is heduled by August.

allace Steel Buys Plant

Wallace Steel & Supply ., Ithaca, N. Y., purchased former Crucible Steel Co. ll in Syracuse, N. Y. The operty was purchased om Jackson M. Potter eal Estate Co. which pur- ased the unused mill from ucible several years ago.

aker Opens Branch

Quaker Rubber Corp., div- on of H. K. Porter Co. c., Philadelphia, opened a ock-carrying branch ware- use and sales office at 872 . Milwaukee Ave., Detroit. R. Alexander is the dis- ict manager of the new anch.

ranco Moves Offices

Offices of Granco Steel roducts Co., a subsidiary Granite City Steel Co., ranite City, Ill., were oved from quarters in the arent company's plant to ace in a Dow Chemical o. building in Madison, Ill. ranco Steel Products Co. anufactures and sells con- ruction industry special- es made from Granite City teel's high-tensile, tough- mper cold-rolled steel. ranco's test shop remained n Granite City Steel Co.'s ant premises and all pro- duction activities will continue to be centered in the steel mill.

Semet-Solvay Expanding

Semet-Solvay Division, Allied Chemical & Dye Corp., New York, producer of coke and gas, is planning a $6,940,000 expansion of facilities at its Tonawanda, N. Y., plant.

Scrap Firm Enlarges Yard

Wilkoff Co., Youngstown scrap firm, is spending over $300,000 in enlarging its Youngstown yard. The program calls for installing a scrap baling press, a 400-foot long crane runway with 90-foot span, two 700-foot tracks, and new magnets on the scrap handling cranes. This program will boost capacity from 8000 tons to about 20,000 tons monthly.

Lockheed Increases Output

Lockheed Aircraft Corp., Burbank, Calif., is equipping a feeder plant in Beverly Hills, Calif., to start production late in September on wing and tail sections of Super-Constellation transports. It is the first feeder plant established by Lockheed since World War II, when similar subassembly operations were activated in nearby cities. Lockheed is installing a 2,370,000-pound hydraulic metal-forming press, which will exert 8000 tons of pressure, in its Burbank plant.

Wilcox-Gay Leases Factory

Wilcox-Gay Corp., Charlotte, Mich., leased an 85,000 square foot factory in Burbank, Calif., for manufacture of Majestic television and radio receivers and Wilcox Gay Recordios.

Furnace Maker Builds Plant

Lepel High Frequency Laboratories Inc., New York, maker of hardening, annealing, melting and brazing furnaces and radio bombarding apparatus, is building a plant in Woodside, Long Island, N. Y., which will be completed next month.

Hilliard Appoints Agent

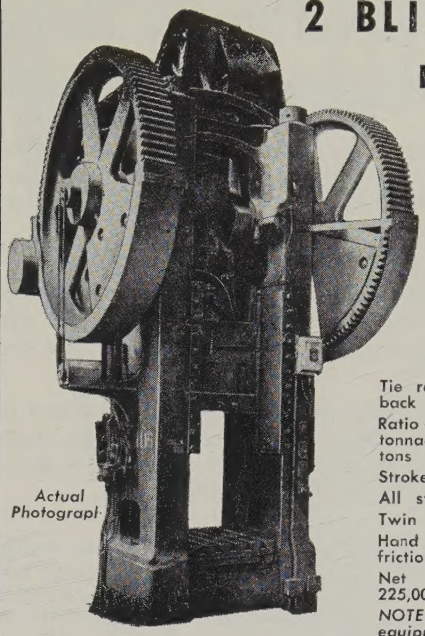
Hilliard Corp., Elmira, N. Y., appointed Guy T. Martin & Co., Gardena, Calif., as representatives in California to distribute the company's line of lubricating, fuel and industrial oil purification equipment.

New Baltimore Tool Shop

Baltimore-Diecraft opened its new 30,000 square foot plant on Pulaski highway at Golden Ring road, Baltimore. Diecraft has no products of its own and is devoted entirely to precision metal fabrication on a jobbing basis. It has facilities

A RARE BUY

2 BLISS #410A DOUBLE CRANK TOGGLE DRAWING PRESSES



Actual Photograph

Tie rod construction double back geared
Ratio — 50:1 — Approx. rated tonnage drawing stroke 425 tons
Strokes per minute—6
All steel gearing
Twin drive
Hand actuated double grip friction clutch
Net weight approximately 225,000#
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Automatic Drilling of Cotter Pin Holes

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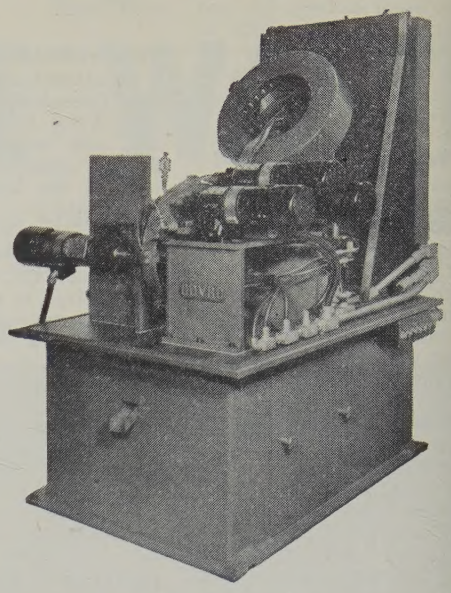

Here is a machine that greatly simplifies not only the drilling of cotter pin holes in clevis pins and screws but also in countersinking both sides. It performs these operations at the rate of 1500 pieces per hour.

The machine is fully automatic, employing 4 model KH Govro-Nelson Automatic Drilling Units which operate simultaneously in conjunction with and completely interlocked with a Geneva type, 8-station indexing dial and a hopper part-feeding mechanism.

The part is first countersunk on one side by one drilling unit. Two units then accomplish the drilling in two stations, thereby reducing the drilling time per piece. The part is then countersunk on the other side by the fourth drilling unit.

If you have similar drilling or countersinking operations, and would like to speed up your production rate, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up.

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Automatic DRILLING UNIT

GOVRO-NELSON CO.

Machinists of Precision Parts for 27 Years

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5 MODELS

TURNING CAPACITIES UP TO 75 TONS

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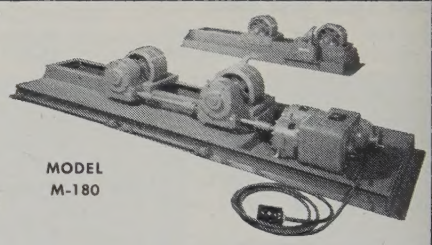

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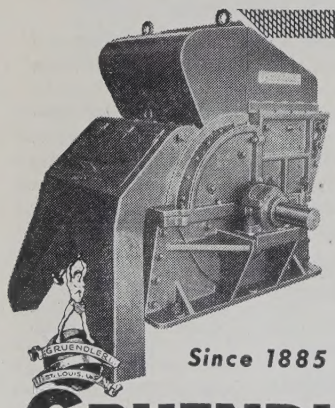
* WELDING FIXTURES * OFFSET & CONTOUR FORMERS *



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Industrial Plants Corporation

90 W. B'way., New York 7, N.Y. (Ba 7-4185)

manufacture all types of uction tools, stamping forging dies, diecasting plastic molds. The com- also has a battery of h presses as well as uction milling ma- es, a turret lathe de- ment and automatic w machines. Merrill S. son is general manager.

ts Dunkirk Plant Output

ue Temper Corp., Cleve- , will boost output from 40 per cent at its Dun- , N. Y., plant. New pment will be installed existing floor space will tilized more efficiently.

s $6 Million Contract

rie Foundry Co., Erie, received a $6 million y Air Force contract for steam hammers with de- ry to be made over a two three year period.

ns Aircraft Tool Firm

& L. Tools, 5003 East son Ave., Maywood, f., owned by Robert H. wn, was formed to manu- ture tools, jigs, and fix- es for the aircraft indus-

alo Electronics Corp.

uffalo Electronics Corp., ffalo, leased space at 37 nklin St., that city, for design and manufacture electronics equipment.

ens West Coast Can Plant

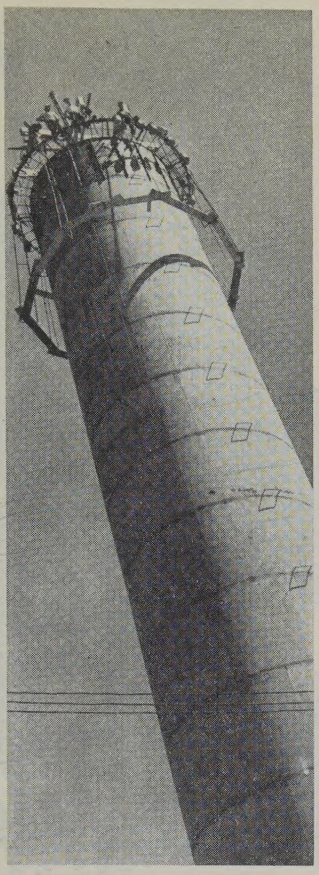
Continental Can Co., New rk, opened its new $2 lion 240,000 square foot rminal Island, Los Ange- plant. To serve the fish king industry in Los geles and San Diego, Con- ental's 12th plant on the st Coast will produce 0 cans per minute.

ant Heater Distributor

Affiliated Gas Equipment 's Bryant Heater Divi- n, Cleveland, appointed kes Co. Inc. as its dis- butor for northern Louisi- a and part of Texas and kansas. Dykes Co., with adquarters at 1012 Market ., Shreveport, La., will dis- bute Bryant heating, ater heating and air con- tioning equipment.

rms Chemical Division

Frank Samuel & Co. Inc., ew York, established a emical Division under the anagement of David R. amberlain, formerly sec- tary of William S. Gray & ., and Gerald E. Stern- eim, formerly export man- ger of Rosenthal Bercow o. H. P. Banks, who han- es ferrous ores, and R. C. lark, who is the New York anager of Nathan Trotter Co. whose business in New ork is nonferrous metals, ill also be connected with e Chemicals Division. The principal business of Frank Samuel & Co. is ferrous ores.



NOT PISA: Dwarfing the workers building it is this draft stack for a battery of 63 by-product coke ovens at Republic Steel Corp.'s Cleveland plant. The stack, now about 80 feet into the sky, is one step in Republic's program to increase its Cleveland steel-making facilities by 672,000 net tons a year

Motor Firm Changes Name

To prevent confusion in the trade between the name of Electro Machines Inc. and several similar firm names, and to better identify name with product, the company changed its name to Doerr Electric Corp. This Cedarburg, Wis., firm manufactures electric motors. There is no change in ownership, management, policies or personnel.

Boyar-Schultz Opens Office

Boyar-Schultz Corp., Chicago, opened an office for sales and service at 401 Broadway, New York. A complete line of Boyar-Schultz screw machine tools, copper head laps, and SMB machine bolts will be carried in stock. The company's profile and surface grinders may also be sold and serviced from the New York offices. The office will be under the management of Oliver J. Green and under the supervision of E. M. Baumruck, eastern sales manager.

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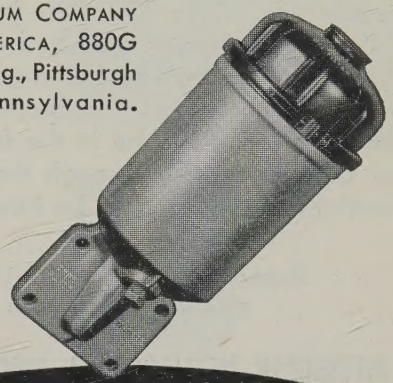
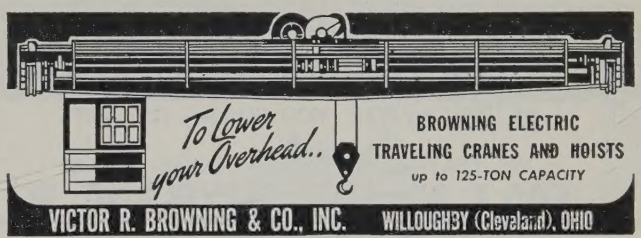


ALCOA ALUMINUM CASTINGS



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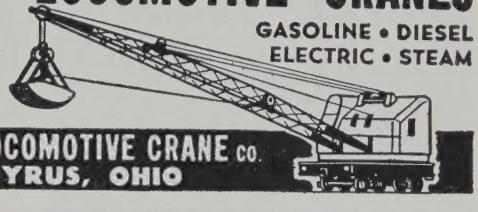

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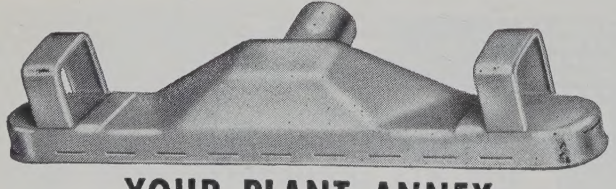

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